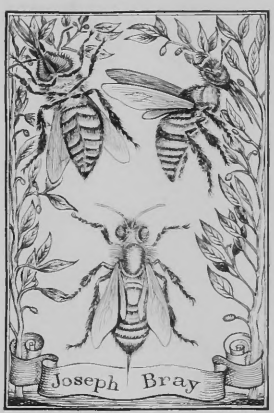
BEE KEEPER.



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1851

THE

ENGLISH BEE-KEEPER;

OR,

SUGGESTIONS FOR THE PRACTICAL MANAGEMENT

OF

Amateur and Cottage Apiaries,

ON SCIENTIFIC PRINCIPLES.

WITH AN

APPENDIX OF NOTES, CHIEFLY ILLUSTRATIVE.

BY A COUNTRY CURATE,

AUTHOR OF A SERIES OF PAPERS ON BEES AND BEE-KEEPING,
IN "THE COTTAGE GARDENER."

"Tollite barbarum morem."

LONDON: DEAN & SON, 11, LUDGATE HILL.

FRANCIS & JOHN RIVINGTON, ST. PAUL'S CHURCHYARD.

TO THE

COUNTRY CLERGY OF ENGLAND,

THIS SMALL TREATISE

ON THE CULTURE OF THE HONEY-BEE,

IS RESPECTFULLY DEDICATED,

BY

THEIR OBEDIENT SERVANT,

THE AUTHOR.

PREFACE.

It will naturally be expected by every one who hears of the publication of a new work on bees, —in the face of the many excellent treatises already extant, some of which have opened to us many marvels in the natural history, while others have facilitated the profitable management, of these wonderful insects—either that the adventurous author has something *new* to add to the common stock of already acquired knowledge upon the subject, or that he has, at least, some satisfactory reasons to allege for intruding himself upon public notice; seeing that to write a book, for which there is no vacant place on the library shelf of the apiarian

reader, must undoubtedly be considered a work of no little folly and presumption. Respecting, as he does, this attitude of very natural expectation on the part of the public, the author of the ensuing pages would submit the following observations to the consideration of the candid reader.

In the first place, there is no one but will readily allow that our knowledge of bees, scientific or practical, however it may have increased of late years, is still limited; or that there is at least room for improvement. If this admission be made, it at once follows that there *is* room for a new work on the subject, however the apiarian's library may seem at first sight to be complete without it.

The author would next shelter himself under the Horatian maxim:—

> "Publica materies privati juris erit, si
> Nec circa vilem patulumque moraberis orbem."

which may be thus paraphrased:—"A well-

known subject, even though already ably handled, becomes as much the property of the author who treats of it anew, as if he had been the first to write about it, provided always it be treated in a *novel manner*." According to this rule, he hopes that so much of novelty will be found in his book as shall distinguish it from every antecedent bee-book, stamp it with an identity of its own, and make it interesting and acceptable even to the old-established bee-keeper. While, however, some matters in this book are undoubtedly new, (whether suggestions originating with, or discoveries and improvements made by himself,) the author having made a free use of every available theory, suggestion, or practice, (from whatever quarter it came,) it follows that the greater part of the volume is old matter, however it may have assumed a new shape. His aim has been, *first*, to recommend a more systematic, and at the same time improved, method of cottage bee-

management than at present prevails; and, *secondly*, to invite the attention of amateurs to his own peculiar plan of managing bees on scientific principles, founded on the considerable experience of nearly eight years, assisted by much thought on the subject; and he believes there are many persons, who, after a due consideration and trial of the system, (artificial though it may appear,) will approve of it as being both simple and effectual, and perhaps better calculated than most other systems (in the hands of an attentive and intelligent bee-keeper) to give satisfaction, as well on the ground of economy as of profit.

The fact is, although it may be said with reason that there never was a time in the whole history of bee-keeping, at least in this country, when the pursuit has numbered so many votaries as at the present moment,—and certainly never did success promise so well to the lover of bees, thanks to the facility with which every kind of

information on the subject is diffused through the medium of the press,—the author believes that the science of practical bee-management is yet but imperfectly developed after all, compared with what it may yet become, if our apiarians will only give it the time and attention which it deserves. No practical results, for instance, have proceeded from, at all commensurate with, the splendid discoveries of Huber, Réaumur, and Shirach, relative to the natural history of the bee; and yet their revelations supply sufficient data upon which a highly scientific treatment of bees might be established. In this little work will be found an attempt to bring our higher knowledge upon the subject to bear upon, and improve, the system of bee-management actually in vogue among us.

The few wood-cuts, it is hoped, will sufficiently answer their purpose of helping out the instructions of the text. If it be complained that they are somewhat rude and primitive, the

fault is to be attributed to circumstances, not to intention.

Other bee-authors, in drawing their labours to a conclusion, have thought it well to solicit the favour of *ingenuous criticism* ;—following in their steps, as considering that many still hidden truths may yet be evoked by a spirit of candid inquiry, tending to throw valuable light on the subject of these pages, the author would also invite the same. Any communications with which he may be favoured, by the intelligent and experimental apiarian, confided to the care of the Messrs. Rivington, will be duly forwarded to his address.

March 29, 1851.

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THE

ENGLISH BEE-KEEPER.

CHAPTER I.

PRELIMINARY NOTICES, RECOMMENDATORY OF COTTAGE AND AMATEUR BEE-KEEPING.

THE history of this volume—how and why it came to be written—I may perhaps be allowed to state in a few words. When I first settled down in an agricultural district, having long been passionately addicted to the study of bees, but chiefly as a recreative pursuit, I turned my attention to the subject anew, with a more practical intent, as I began to view in it one means, among others, of improving the condition, both financial and moral, of the surrounding peasantry, many of whom were suffering greatly under the pressure of the times. The vicinage, as affording bee-pasturage, had ever been considered remarkably good; and the honey of the district too was much esteemed. The culture

of bees itself, however, was almost in its lowest condition, at least amongst the poor. I argued to myself, therefore, that if only half-a-dozen families could be permanently benefited by my instruction and encouragement, it would amply repay me for any trouble I might incur. To lose no time, I at once established a second apiary of my own, in the management of which I hoped to acquire such sound additional knowledge of bee-matters, as should qualify me to act as a pioneer, and ultimately to become the propounder, of a better system than that which prevailed around me; nor was it long before I felt myself in a position to start my plan of cottage bee encouragement. At the same time I sought other aid in the published treatises of older and more experienced bee-keepers, some of whom I knew had endeavoured to write for the benefit of the poor. But seek as I might, I sought in vain for the tract whose instructions generally my own experience would justify me in recommending to their notice. It was about this time I formed the design of myself attempting to supply this desideratum in apiarian literature; but after spoiling much good paper, and wasting not a little valuable time, I was fain to give it up in the end, not from any doubt as to the matter or instructions which I designed to give being good and useful, but from a sense of the difficulty I should find in successfully hand-

ling the subject, so as to bring it down to the understanding of the poor. From the *débris* of this tract, however, arose the conception and outline of the present work, which by degrees assumed its actual form,—less modest and unpretending it may be than the parent from whose ashes it proceeded, but, I would fain hope, not the less calculated to please and to be useful.

My first object, however, remains unaltered. I wish to induce all residents in the country, who have leisure and opportunity, to encourage bee-keeping among their poorer neighbours;—and not with a view to their *pecuniary* advantage *only*, for the study of bees is capable of ministering to a much higher end. There is scarcely a more interesting branch of natural history to be mentioned, and none certainly more instructive. To quote the words of Dr. Bevan: "In common with the other branches of natural history, it leads to a salutary exercise of the mental faculties; it induces a habit of observation and reflection; no pleasure is more easily attainable, nor less alloyed by any debasing mixture; it tends to enlarge and harmonize the mind, and to elevate it to worthy conceptions of nature and its Author." Every word of this is true. The rustic bee-keeper, if he have only a soul to appreciate the works of God, and an intelligence of an inquisitive order—and intelli-

gence is sure to expand with the attentive study of any branch of natural history—cannot fail to become deeply interested in observing the wonderful instincts (instincts akin to reason) of these admirable creatures; at the same time that he will learn many lessons of practical wisdom from their example. Having acquired a knowledge of their habits, not a bee will buzz in his ear without recalling to him some of these lessons, and helping to make him a wiser and a better man. It is certain that in all my experience I never yet met with a keeper of bees who was not a respectable, well-conducted member of society, and a moral, if not a religious, man. It is evident, on reflection, that this pursuit, if well attended to, must occupy some considerable share of a man's time and thoughts. He must be often about his bees, which will help to counteract the baneful allurement of the village "public," with all its accompanying syren-like evils. *Whoever is fond of his bees is fond of his home:* this is an axiom of irrefragable truth; and it is an axiom that will be sure to kindle in every true Englishman's breast a favourable regard for a pursuit, which, though humble, has undoubted power to produce so happy an influence. "Where the Frenchman sings of his *country*, we talk of *home*. . . . We point with exultation (and I trust with *gratitude*) to the firesides of England, and claim the admiration of the world for the virtue

which has gained so high a reward." Who will not assist in any efforts, great or small, which may continue this our claim to universal admiration? Who, that sees in the love of home the companion of many other virtues, which, if not yet developed into active exercise, are still only dormant, and may be roused into wakeful energy at any moment?

To gain the attention, however, of the poor themselves, with the hope of successfully instructing them in an improved system of bee-culture, is confessedly not an easy task. While in other countries the peasantry need little instruction from their superiors in this matter —their own quick intelligence supplying them with every necessary encouragement—it must be acknowledged that our rustic poor are slow of apprehension to a proverb, and unready at learning even from the successful examples of others. Hence it is proper to give them gradual instruction, taking care to make the first converts in a neighbourhood of the most industrious and intelligent of its cottagers. It is obviously useless, also, to recommend to their notice any system of complicated machinery or of fanciful contrivance. Every suggestion and every improvement which it is intended they shall take in, must be of the most simple kind. I do not think it necessary to say much on the subject of *expense;* for costly experiments must

ever oppose an insuperable barrier to bee-improvement among the poor. Simplicity of detail, therefore, and perseverance in instruction, as well as personal example, must go hand in hand together in any attempts to increase the number of, or to improve the system actually in vogue among cottage bee-keepers. I would fain trust that the system of cottage management, explained further on, will not be found so difficult as to prevent its answering the first of the requisites above mentioned; for the other, the benevolence of the higher classes and their kind co-operation must be looked to.

It is because I believe our rural clergy have it in their power more than any body else to encourage this branch of rural economy, that I have dedicated these pages especially to them. Owing to their continual residence within their parishes or cures, they have the best opportunities, both of acquiring themselves a thorough knowledge of the practical management of bees, and, at the same time, of recommending it to the notice of their people by precept and example. Nor is it alone in respect of the more extended good which they may do to *others* that I would call their attention to this subject, but also on account of the peculiar interest and pleasure which they *themselves* may derive from it. Independently of the interest which attaches to the apiarian art from economic considerations,

and the pleasure of appropriating to one's own use the surplus produce of bee industry,—a pleasure, by the way, of a very exquisite kind, as every bee-master will bear me witness,—it merits, *as a branch of natural history*, the attention of every lover of nature, and the curious investigator of her secret things. There is still so much mystery attached to the habits of the bee, and especially to the internal economy of the hive, that the scientific study of these insects affords ample scope for much patient and hopeful research. Supposing, however, that the whole history of the hive-bee had been opened up so as to preclude the hope of further discovery, there is quite enough in the simple verification of the discoveries of others to interest and astonish the lover of nature. In every way, indeed, the study of bees is so fascinating and instructive, that I would gladly induce many of my brethren in the ministry to share its pleasures with me.

Having said thus much on the subject of bee-keeping generally, by way of recommending an increased attention to it, let me say a few words as to its *difficulties*. These certainly are neither few nor trifling, although perfectly easy of mastery by the patient, intelligent, and persevering bee-owner. The less he can lay claim to this complex character, the greater of course will his difficulties become. But are not these qualifications considered necessary to success in every

branch of rural economy—I may say, in every pursuit in life? Did one ever hear of stupidity, sloth, or inattention succeeding in any enterprise of whatever kind? The farmer who is content with an occasional stroll over his fields, and a similar inspection of his yards and granaries, will in vain expect to thrive. Can we wonder at the ill success of an ignorant or negligent bee-keeper? And yet how often is the expression of surprise heard from the lips of some individual who has started an apiary, that his bees have disappointed him; when, if particular inquiries were instituted into the cause of the disaster, ten to one it would be found that the hives had been left unnoticed from October to May, and from May to October! The management of bees, which always requires some delicacy, and not a little dexterity of treatment, assuredly demands no less attention and care than other matters of a similar nature. A considerable apprenticeship is necessary in order to obtain the mastery over it as a science. There is no "royal road" to successful bee-keeping, as there is none in any thing else. In his preface to his very useful book, Mr. Taylor has well styled the tyro apiarian's path, "usually a rough and uncertain one;" so rough, indeed, and uncertain, (chiefly owing to a lack of care and pains,) that three out of every five persons, who take up this study even warmly, will be found to

relinquish it with disgust at the end of a few years. Not to dwell here on faults of management, there are other causes of failure, almost peculiar to this country, a few of which I may briefly enumerate. While in America or Australia[1] it is almost incredible of how large an apiary one hive may become the parent in a very few years; in England a similar hive may stand year after year, without change, apparently strong, yet unproductive in either swarms or honey, perhaps in both together. A stock, at the time of purchase, may have had a three or four-year-old queen, (an evil which is seldom acknowledged, and still more seldom guarded against,) who dies some time in our long winter before there is brood wherewith to replace her; the winter may be mild and the spring cold and late, and no honey gathered till the end of May, whence proceeds the death from starvation of many a colony of bees, (which might be saved by a judicious and timely supply of food,) or its productiveness for the current season destroyed. A rainy summer, too, may follow, or a very dry one, neither of which yields much honey; in short, a thousand are the

[1] In a late work on New South Wales, I read the following astonishing account of the produce of a single stock of bees:—"In the district Illawarra, near Sydney, one hive has been known to multiply itself to 300 (!!!) in the course of *three* years!"

casualties to be feared in this fitful climate, with which the more fortunate bee-keeper of other countries is happily unacquainted. Say, then, whether it is reasonable to expect success in the face of these difficulties, where a considerable skill and much persevering watchfulness are not present to meet and counteract them? To be successful in bee-keeping, there must be a sufficient experience in bee-management, whether derived from a practical acquaintance with the subject, or from a diligent study of the best manuals of instruction in the matter; it is requisite to be thoroughly initiated in the mysteries of judicious feeding, and to understand somewhat of that improved system of bee-culture, by whose means the great honey harvests are secured at those rare but favoured seasons when they occur, and the most is made of indifferent years; while at the same time the acquisitive propensity is kept duly in check, so that if *much* is *taken* as legitimate spoil, *enough* shall still be *left* to support the prosperity of the hive. Difficult, however, as unquestionably is the science of bee-keeping, it is not beyond the reach of attentive perseverance; and the very difficulties, as in most cases, only serve to enhance the pleasure and gratification of the patient bee-master. It has been judiciously observed, that "no one who pays a fair amount of attention to the management of those very interesting insects

will willingly relinquish the keeping of them." Carelessness and indifference alone find the difficulties to which I have alluded insurmountable, and I take leave to say *they deserve to do so.*

CHAPTER II.

OF THE ESTABLISHMENT OF AN APIARY: CHOICE OF A SITUATION: AND REQUISITES FOR ITS WELFARE.

THERE are some parts of England where, it is to be feared, the utmost attention to bee-keeping can meet with only very partial success. In such places it is but once, perhaps, in four or five years that any thing like a fair harvest of honey is obtained. It may be asked, therefore, is it worth while encountering the many vexations and discouragements of the intermediate years, for the sake of this inadequate, and only occasional, remuneration? This is a question, of course, for every intending bee-keeper to answer for himself. Having myself kept bees for about seven years in a locality of this kind, I can speak feelingly of the disappointment and loss occasioned by it. In all that time I never had the good fortune to obtain a single pound of honey by fair means; and what I did obtain, at the cost of a hive's sacrifice, was both poor in quality and insignificant in quantity. Nor was my case at all singular in this respect, my neighbours to a man complained of the like ill success, in spite of attention and pains bestowed without grudg-

ing. I was in consequence very nearly giving up the pursuit, as many others had done before me, although not reputed to be readily daunted by mishaps. My advice, therefore, to every aspiring bee-keeper, who can assure himself that the locality in which he happens to reside is of this nature, is this, *to let bee-keeping alone.* Happily, however, such instances of very bad locality are rare. Most places will at least amply repay the labour and cost of establishing an apiary; while some few highly-favoured districts will yield astonishing supplies of the most delicious nectar. Whoever happens to reside in the vicinity of large woods, heaths, or commons, or still better, within reach of all these together, may consider himself especially fortunate. A broken country, however—by which I mean a country devoted to no particular branch of husbandry—is not far inferior, where water, woods, and meadows divide the land between them.

The question being settled, "to be or not to be," as regards the establishment of an apiary; next are to be considered sundry *necessaria* to its well-being, which, for facility of reference and conciseness, I have drawn up in a set of rules, gleaned for the most part from a variety of sources, both ancient and modern, at the same time attested by my own experience or approval. They have reference in general to the requisites of every kind of apiary, but are drawn up

for the more especial instruction of those who prefer the use of the cottage hive, standing in the open air. I think it unnecessary to dwell upon the subject of *pasturage*, which has been fully treated of by other writers, because nothing but supplying it (if it must be supplied artificially) on a large scale is of any material advantage to the prosperity of an apiary. *White clover* and *buck-wheat* (the latter of which is excellent food for poultry) may be sown largely with double advantage—*clover* more especially, as sheep and cattle are extremely fond of it; also the more *laurustinus* about a house the better for early spring feeding; but, beyond this, I would recommend no especial provision for the apiary, as the land so occupied may be cultivated to much better advantage.

To proceed, then:

I. All out-door bee-hives of wood or straw must be placed in a well-sheltered situation. A garden in a valley, well protected on all sides from the effect of high winds, undoubtedly ranks among the first of bee localities; but it is of little importance where the apiary is situated, so that it be not in a *damp* spot, nor exposed to the fury of *high* winds from any quarter. These last are especially detrimental to the prosperity of an apiary, those more particularly which blow from the south-west, round by north, to north-east, and east.

II. It is of less consequence that the hives be warmly situated in winter, than that they be screened from the morning sun in the very early spring, and from the fierce noonday heat of summer and autumn. This is most injurious, although but little attention has been paid to the matter generally. Therefore by all means let them be protected, if possible, by some verandah or screen from the sun's rays. In this case the best aspect for them is undoubtedly the south-east or south. If, however, they cannot be thus conveniently and effectually shaded, the hives must be set at the back side of a high wall or fence of trees, facing eastward or westward—the latter aspect I think the best of the two. So much alive are some apiarians to this evil, that they prefer turning their hives with a point to the north; nay, it has been proposed (and with a show of reason) to keep them always facing the *direct north*. In their natural state we know bees seek an uniform temperature, by burying themselves deep in the hearts of forests, where the sun's rays seldom, if ever, penetrate. Their own restless activity keeps them alive enough in summer, while they are so snugly housed in winter as seldom to be induced to sally forth; hence arises this further advantage, that they prey but little on their stores. It cannot be too urgently recommended to keep the hives as cool as possible in the late spring and sum-

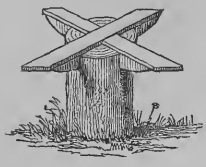
mer, for it will be found as a general rule, that, in proportion as this be carefully attended to, the swarms will be stronger, the bees more vigorous and indefatigable in the collection of honey, and the honey itself more wholesome and pure. It may seem paradoxical to recommend coolness of situation, when it is at the same time fully acknowledged that heat is the great promoter of early and vigorous swarming; yet the advice is not the less based upon sound reason and experience. It is true some bee-keepers remove all cover from their hives in a hot May or June sun, with a view expressly to compel early swarming; I have done so myself in the days of my noviciate: nothing, however, can be conceived more fatal than such a proceeding. The queen will leave the hive very little sooner for such treatment;—certainly it cannot expedite the birth of royal issue a single moment;—but the harm done to the hive's prosperity is incalculable. Before swarming takes place under such circumstances, the queen bee and her subjects will long have been grievously incommoded; the process of breeding will have been hindered; many of the grubs will have perished, or at least thousands of eggs become abortive; while certainly no addition will have been made to the stores of honey, if the combs do not actually give way under the influence of the unusual heat. Thus the issuing swarm must

needs be weak, and the old hive from which it issued impoverished in every way. This, therefore, I lay down as a rule of sound doctrine, that *internal* heat, arising from an over-crowded population, is *alone* productive of prosperity in the economy of bee-management[1].

III. Every hive should have its own stand and single pedestal, *i. e.* a pedestal, and board on the top firmly nailed to it, distinct from the bottom-board of the hive. The pedestal itself may be of pine, slightly charred where it enters the ground, and its top of stout inch-oak. I advise the use of a separate bottom-board for each hive, for facility of weighing, cleansing, &c. Mr. Taylor has given a useful hint for those who would dispense with this second board, at page 30 of his Bee-Keeper's Manual. He recommends a square-topped pedestal, and advises the construction of a sort of cap, made of pieces of wood nailed to the under side of the bottom-board, so as to fit on the top of the pedestal. A screw, passing through one of the sides of this cap into the pedestal, secures the board with the hive upon it. If this plan be adopted of securing the hive, let every cap or socket of every board, as well as every pedestal, be of exactly the same size, so as to allow of the boards being shifted, as occasion may require,

[1] See Appendix, Note A.

from one pedestal to another. To those, however, who may be disposed to follow the plan of management detailed in the following pages, I doubt not the use of a *second* board to every hive will appear more advantageous. A friend of mine has constructed a very neat, and indeed ornamental, stand in his garden, consisting of a post let into the ground, having two pieces of wood arranged crosswise on the top, in the following manner, as seen in the sketch. A couple of screws would secure the hive from accident, if passed through the board into the bars. While on the subject of hive-boards, let me urge the advantage of carefully ascertaining the weight of every article of bee-furniture (as hives, boards, &c. &c.), and marking the weight legibly on each, so as to be able at any moment to ascertain the weight of the contents of every hive. This will save much trouble.



IV. As a general rule, there ought to be a space of three feet at least between the hives as they stand together in a row; or, to suit the plan of management hereafter to be described, each prime-swarm of the year had better stand within a foot and a half of its parent hive, at its side; every two hives so placed standing as a *duett* (if I may so call it), at a distance of four

feet from the neighbouring hives. Hives so managed would occupy about the same space in an apiary as if they stood individually three feet apart from each other. I advise this for the manifest advantage which will accrue at the time of the autumnal harvest, when the bees out of one hive, on plundering it, may be saved and united to the adjoining stock, at the least possible waste of bee-life, and without creating a confusion in the apiary. A good height from the ground is sixteen inches. Not too many stocks should stand together in the same place; from eight to ten hives are sufficient for one locality. Where more hives are kept, the apiary should be divided into two or more parts, as widely separated as possible. Where bees are domiciled too closely together, and in too many families, much confusion is apt to be created at swarming time, when the agitation which one hive occasions during the process of swarming, not seldom communicates itself to the others.

V. It is of the utmost importance that water be at hand, especially in spring, when bees consume great quantities of it. In very dry weather it is almost essential to the *existence* of an apiary, that it be supplied artificially, if there are no rippling streams or other suitable waters at hand. Some large pans filled with stones and water, and covered with moss or sticks,

for the bees to alight upon and drink with safety, should be placed near the hives. While, however, water is so essential, the vicinity of rivers or large ponds, or sheets of water, is to be deprecated, as tending to endanger the lives of thousands of these valuable insects in windy or showery weather.

VI. Keep away from the bees' neighbourhood all vermin and foul smells of every kind. Among bee-pests may be enumerated pigs (with their sties, and all dung-heaps), fowls, mice, slugs, snails, ants, hornets, and wasps. Of these, the latter are decidedly the most formidable. The vicinity of lime or brick-kilns, tan-yards, gas-houses, and offensive premises of every kind, is annoying to them.

VII. The garden in which the apiary is situated, especially in front and about it, should be well stocked with low shrubs or espaliers, at a convenient distance, backed, if possible, by taller trees. These are, of course, requisite to allure the bees at swarming time to settle near home, for convenience of hiving, instead of wandering off, as they are very apt to do when the coast is clear, nobody knows whither.

VIII. A well-mown and cleanly-kept grass plat, or a gravel walk, affords a capital ground for the hives to stand upon. They should not, however, be far distant from some wall or thick fence in the rear; but there must be *plenty of*

room behind for the performing of every necessary operation.

IX. No drippings of trees, or water-drops from the eaves of houses, should be suffered to fall upon, or near, the apiary; for damp is of all things perhaps the most hurtful to bees. It may be asked, Why not elevate the hives at a greater height from the ground, such being the case? To this I answer, that of two evils the lesser is chosen, the stands being low to preserve the hives from the effects of high winds. No long grass or tangled weeds of any kind, no cabbage or lettuce plants, should be suffered to grow within two yards of an apiary, more particularly in front, for the young or weak bees alighting upon them, will fall into them and perish, on their return from the fields in cool weather.

X. Let the apiary be so situated (in the last place) as to be in full view from the most frequented part of the house, for the instant discovery and remedy of accidents, and the observation of rising swarms. The hives had also better be removed out of sight of a highway, to avoid the danger of their being stolen.

CHAPTER III.

OF STOCKING THE APIARY, WITH DIRECTIONS FOR THE PURCHASE OF STOCKS AND SWARMS.

THERE are two methods of stocking an apiary, —by *swarms* purchased in the spring, and by *stock-hives* bought at the close or beginning of the year. The former, as being the cheapest, (the cost of a prime-swarm averaging from ten to fifteen shillings,) will ever be the favourite method resorted to by cottagers. To be worth the purchase, a swarm, which *must always* be the *first* or *prime-swarm*, should not weigh less than four pounds, and it should issue from the parent hive not later than the 7th or 8th of June; for every week after that date, eighteen-pence or half-a-crown (according to the price-current of a swarm) must be deducted from its value. After the 21st of June it is not worth five shillings, unless indeed the season should be very fine, and the swarm very large. The most valuable swarms, perhaps, are those which issue early in the fortnight previous to the 7th of that month; but, of course, much will depend upon the season, for should it be late and unpropitious, a swarm of this date will be more valuable than

one which issued on the 25th of May; while in some forward years a most profitable swarm will be thrown a fortnight earlier than this.

If possible, in the purchase of a swarm, the *age of its queen* should be ascertained, and a *young* mother selected. The best swarms undoubtedly (*cæteris paribus*) are those which proceed from *two-year-old stocks* OF LARGE SIZE, *that sent out a swarm the previous year;* because it is certain they have young and vigorous queens, and the condition of the parent hive is eminently favourable still to the production of a healthy brood. This advice, as every well-instructed apiarian will at once perceive, is based upon the knowledge we possess, that every prime-swarm (the exception proves the rule) is led forth or accompanied by the old queen, who in so doing vacates her throne in favour of one of the shortly expected princesses. But a swarm from a *very old* stock, although it may have a young queen, is *carefully to be rejected;* for the bees having been bred for the most part in contracted and, perhaps, vermin-eaten cells, will be generally found of small size and insignificant in numbers. Sufficient attention is very seldom paid to this matter, most people being content with *any* prime-swarm they can procure, from an idea, that because it is a *prime-swarm*, it must *therefore* of necessity succeed; and yet it may be often worthless, as containing an old queen of

say three or four years of age, who will very probably die in the course of the ensuing autumn or winter. To this ignorance are to be attributed most of the mishaps and ill-successes of bee-keeping. I am aware of the difficulty there is, in the present low condition of bee-science, in following this advice, when there is not a cottager in the three kingdoms but would stare on being asked so (to him) incomprehensible a question as the *age* and *pedigree* of his queen-bees! I rather throw this out as a hint for the instruction of cottagers, who should be taught the advantage of putting down in a book the date of issue of every queen in their apiaries. There might be affixed to these swarms or stocks a regular price according to their value. Thus, for instance, twenty-five shillings would not be too much to ask for a stock in the spring that has well survived the winter, of which the bees are in full vigour, and the weight over 18 lbs., it being moreover a stock of *two years' standing, which swarmed the year before.* No one who was aware of the value of such a stock ought to grudge giving twenty-five shillings for it. It might be considered worth a pound sterling if purchased before the winter. Again, a current-year's swarm, which proceeded from a stock of this kind, would be worth full fifteen shillings, if it issued before the 1st of June, and even later. Other swarms and stocks might have a price put

upon them in proportion to their individual value. Such a plan would tend to reduce bee-management to a system, and would help to remove many of its uncertainties; nor is it at all difficult either to acquire a knowledge of its details, or to impart the same, when acquired, to others.

As to the other method of stocking an apiary, I decidedly prefer the purchase of a *stock-hive* or *hives* in the autumn or spring, especially the latter, *i.e.* about March or April, when the winter is safely passed. Independently, however, of the larger sum which is usually asked for stocks that have survived the winter, it is often difficult to get them at any price, as the cottagers are naturally unwilling to diminish their stock of brood hives when the return of the profitable season is so near at hand, thinned as they not seldom are by the casualties of winter, besides which it is almost cruel to tempt them to do so even with a large bribe. And yet if such hives can be bought without scruple, a good March or April-purchased stock ought not to be overlooked, on account of the more speedy and large return which may be expected from it. Should it be found necessary, however, to commence with autumn-purchased hives, as will generally be the case, let *two good stocks* be transferred at once to the apiary, this will give double chance of success, nor will the loss of one hive the fol-

lowing spring be felt so much, if its fellow survives and thrives *ad libitum*.

If the commencing bee-keeper is not over-confident in his own experience, which he will do well not to be, let him procure the assistance of some apiarian friend of long standing and tried acquaintance with the whole science of the matter, for true is often the case in this instance as in other things—"all is not gold that glitters;" of this the "gude wives" all over the country are well aware; and, as (report says) they are not always (to their shame be it spoken) anxious to do to others as they would be done by, not seldom will they take grievous advantage of the ignorance of a novice. If such an experienced friend is not to be found, the following rules will be found useful. Where the word of the bee-merchant is at all to be depended on, let the age of every hive and *queen* in the apiary be first inquired after, and then proceed to the examination.

I. A prime-swarm of the current year may generally be known by its abundant population, the completeness of its works, and especially by the pale brown or straw colour of its comb.

II. The bees must be vigorous as well as strong in numbers; while they fill up well the interstices between the combs, they must be on the alert and waspish—ready, I mean, to resent any intrusion or attempted approach to them. On a fair day at either season (but especially in

the spring) they ought to play in and out of their hive with much activity, by far the greater proportion of them being seen (at least in spring) to re-enter the hive with well-laden thighs. This is in itself almost decisive, being an unfailing criterion of the *present* vigour of a hive.

III. If *a current-year swarm*, the stock should not weigh less than 23 lbs. or 24 lbs., exclusive of hive, at or soon after Michaelmas. If bought about Lady-day, it should weigh *at least* 16 lbs. of contents. A two-year-old stock should weigh a pound or two more.

When a *swarm* is to commence an apiary, let the hive in which it is to be placed be sent some time previously to the bee-keeper with whom the purchaser is in treaty. It ought also to be located on its destined stand in the apiary on the evening of the day on which it issued from the parent hive. In the transport of a stock (should such be bought), great care is requisite to prevent concussion, lest any of the combs should break down. Where these are fresh, the danger of course is greatest. They may be removed at any time between Michaelmas and Lady-day. The greater the distance from which a stock is brought, the less chance there is of the bees wandering back to their old haunts and there perishing.

CHAPTER IV.

OF STRAW COTTAGE-HIVES—THEIR SHAPE, SIZE, AND CONSTRUCTION.

The bee-master, who has safely reared an autumn-purchased stock through the winter, or procured one in the spring, as well as the cottager who is on the look out for an early swarm, will, with the arrival of April, be making preparations for suitably accommodating with hive-room the expected addition to their cares. The old cottage bell-hive it will be well to discard altogether, as being wholly unsuited to an improved and profitable system of bee-management. What kind of bee-domicile, however, shall be substituted in its place is a matter of some difficulty to determine, owing to the multitude and the variety of hives which one author and another have put forward with all the earnestness of self-recommendatory enthusiasm. Most apiarians have each their own favourite hive—favourite, because in some way or other modified and improved according to their peculiar fancy. Of all that I have either seen or heard of, the most suitable for *cottagers* on the ground of cheapness and simplicity, is, I think, Mr. Payne's

hive. I have but one objection to it on the score of *size*. It is, I think, *too small* for *single* stock-hives kept for swarming purposes, and *too large* for a *doubled* or storified colony. For the former I would recommend, instead of twelve inches in diameter by nine inches high, not less than fifteen inches in diameter, inside measure, by eight inches high. This size will do for any kind of system, where *strong swarms* are an object of attainment.

For myself, as will be seen in the plan of bee-management explained in the following chapter, I aim at separating the *breeding* from the *remunerating* business of the apiary, by encouraging the process of *breeding* in *one* hive of large size, (which hive is kept on from year to year for this purpose alone,) and the *harvesting of honey* in another dwelling composed of *two* hives, each individually smaller than the other, though collectively larger. In this way, as soon as the stock hive has thrown off its prime-swarm, it is put in this doubled hive, and suffered to remain till autumn, when the bees are driven from it, and returned again to the hive whence they issued earlier in the season, while the *entire contents* become the spoil of the bee-master. For this second, or *spoliation* hive (as I call it), I recommend a size of eleven inches in diameter by nine inches in depth, *i. e.* (where the two hives are put together) of eleven inches in diameter by eighteen inches in height,

which makes it considerably larger than the breeding hive. I prefer two hives to one large one, because it favours the storing of a purer kind of honey, (in the upper part, at least,) than if it was all laid up in the same hive, to every part of which the queen-mother has free access for laying eggs; otherwise I would recommend a size of seventeen or eighteen inches by twelve for a *single spoliation hive.* The swarm put into this hive is encouraged to increase itself to the greatest possible size, (which the large dimensions of the parent hive tend to favour,) before its issue, after which all casts are returned, and the old hive, with *a new queen*, suffered to enrich itself for another year.

The material of which all hives of straw should be, if possible, constructed, is sound unthrashed rye-straw, the universal testimony of all bee-writers justly recommending it. Let the hives be made rather stouter than usual, especially if they are to stand in a cold situation—one inch and a half thick is not too much, *well and tightly bound together.* The boards upon which these hives rest must be of stout inch or one-and-a-half-inch stuff, and they will be of two sizes, agreeing with the dimensions of the stocks to be placed on them; but each board should project at least one inch beyond the hive in every direction, being planed to a slope three inches all round for carrying off the water. Moreover, the

lowest band in every hive should be worked upon a hoop of wood of as nearly as possible the same thickness[1]. In this case the entrance-way may be cut in it, three-eighths of an inch high, (rather more than less,) and four inches wide; otherwise the entrance might, and I think with greater advantage, be grooved out of the floor-board itself, having a gradual ascent into the middle of the hive. The wooden hoop recommended above "gives greater stability to the hive, (says Mr. Taylor,) preserves the lower edge from decay, and affords facility in removing it:" all weighty reasons in its favour.

Some persons will probably object to the larger hive on account of its size. I am, however, perfectly convinced[2] that large hives are favourable to the production of large swarms, without the securing of which no apiary can be reputed as well-conducted, neither certainly can it be profitable. To all who are disposed to dispute it, I say, give large hives a fair trial, and they will fully agree with me.

[1] Care must be taken, in affixing this hoop, not to increase the *height* of the *interior* space of the hives beyond the eight or nine inches respectively. Allowance must therefore be made for it on first constructing a hive.

[2] See Appendix, Note B.

CHAPTER V.

OF THE COTTAGE SYSTEM OF BEE-MANAGEMENT IN THE OPEN AIR.

It is my intention in this chapter to follow through two years of his experience the fortunes of some imaginary bee-keeper of the cottager class, who is supposed to have been well instructed in my peculiar plan. If I shall seem prolix and over minute, I must crave the indulgence of the kind reader, who will, I trust, bear with me, a principal object in this chapter being the complete guidance of the novice in the somewhat delicate manipulations necessary to success in this matter. I have been greatly surprised at the idea of mystery which many persons seem to attach to the simplest of bee-operations, as well as at the amount of courage thought requisite by not a few in approaching bees. With respect to the latter, I am bound to confess there are few persons more afraid of these insects than myself, and yet I have obtained a perfect command over them, as witness the success of my experiments. The fact is, knowing from experience that I am never safe from an attack, I take care always to be well

protected against their stings; and this is the secret of my coolness and daring in conducting any, however difficult, process of bee-management. Should any of my readers labour under a similar fear of bees' stings, let me suggest to them the use of a bee-dress, which will render them proof against all possible attack from any number of these insects, otherwise so justly formidable. As to *mystification*, I have yet to learn wherein it consists. There are many persons, however, so extremely simple, so utterly "lost for want of hints," that unless every thing be explained in the minutest manner, it does not fail to wear an appearance of mystery in their eyes. To such persons I address myself in this particular chapter.

I. Let us suppose, then, that our commencing bee-master, having purchased a stock[1] in March or April, or in the preceding autumn (which has survived the perils of winter), has the gratification of beholding, after some patience, the issue of a fine swarm on a sunny morning in May. No sooner is it settled (which was none the speedier for his "tanging," should he have resorted to that primitive and enlightened practice) than he proceeds, with his bee-dress on,

[1] I do not notice the case of a cottager who may have commenced his apiary by the *purchase* of a *swarm*, as he will learn from the second year's treatment of the apiary, as given further on, every thing requisite for him to know in the matter.

to the bush or tree on which the bees have alighted, whence he sweeps them, with a goose-wing, or with his gloved hand, into a honey-smeared hive of the *larger* kind, (as recommended in the last chapter,) whose weight ought previously to have been carefully ascertained.

Now if this swarm issued early,—say on or before the 25th of May,—it were best to return it at once to the parent hive, *after destroying its queen*, unless indeed it be ascertained of a certainty that her age does not exceed *two full years*; though even here I should feel disposed to get rid of her to make way for a young queen, as there is no doubt whatever that the queen-bee is in her prime for breeding the *second* year of her existence, after which her vigour sensibly declines. While, therefore, she may readily be suffered without hazard to live over a *third* spring, it is, I think, far more profitable to keep up a succession of royalty *in its prime only*, by getting rid of the old queen every year. It may seem a difficult operation to catch and destroy a queen, whereas, in truth, all that is required is a cool and fearless temper, (which a bee-dress ought to give,) a good pair of eyes, and a quick but steady hand. The delay in swarming will not be great or injurious, while the greatest possible advantage will accrue from this treatment, not only in securing the inestimable advantage of a young queen, who will be in her

prime the following spring, but also in the *increased population that will be added to the swarm on its second issue.* I lay great stress upon this advantage, as it is a main feature of my system that the prime-swarm should be, if possible, *twice as large* as such swarms usually are. The process of catching the old queen, and returning the swarm, is extremely simple and interesting. It is as follows:—first, the new swarm having been temporarily hived in the ordinary way, is quietly placed on a stool or table as near as possible to the place where it alighted, taking care to shade it effectually from the sun, after which the bee-master hastens to the old hive, and blocks up the entrance hole by means of a piece of list wound round the hive, (tied *in a bow,*) so that not a bee may pass in or out. A little space should be left, perhaps, for the admission of air, by thrusting a few bits of slate beneath the edge of the hive. This done, a sheet or table-cloth is spread on the ground in a shady place, not less than three yards distant (though not too far) from the old hive. Next the hive is brought, in which the new swarm has been temporarily located, and its contents dashed out upon the middle of the sheet by a sudden and smart blow or two on its top. The bees thus exposed to view,—startled, as well they may, by the rude treatment they have received,—appear confused and almost stupified, and seem scarcely

disposed to move. *Now is the time to search for the queen*, and the more eyes the better: scrutinize the mass carefully, seek every where, examine with a small stick or spoon every heap of bees which seems larger than another, until the person of majesty is secured. If, on being knocked out of the hive, the bees take wing, (which however will rarely, if ever, be the case, where the operation is conducted in the *shade*,) the whole swarm will return to the old stock, (their flying elsewhere is now inconceivable,) where they will congregate in a large cluster near the entrance, vainly endeavouring to get admission, owing to the impediment of the list bandage. Here, then, the apiator comes, and searches every where among the living mass until successful in his search. As soon as the queen is caught, let him quit the scene of operation instantly, and either destroy her at once, or put her under a glass or tumbler inverted, together with a few workers: she would prove an invaluable boon to the weak hive of some neighbouring cottager, if not too old. Returning then quickly to the garden, the bee-master unlooses the list bandage, if somebody else have not done this already, and permits to the outlying bees free access to their ancient home, into which they will speedily enter. At first they will be somewhat restless, but every thing will have become tranquil long before night, the

bees consoling themselves the more readily for the loss of their queen, with the prospect of a speedy issue of royal brood. The apiator must now watch carefully for the *second* rising of the swarm, which will *generally* take place *between the seventh and tenth day after*, though sometimes sooner or later, as the case may be. It will rise, however, with greater readiness and regularity than the *first*, as well on account of the crowded state of the hive, as because young queens are known to be less dependent on the weather than the old ones. When risen and settled, let them be speedily hived, as before, in their improved permanent dwelling, (*a large hive* if it is to be kept to another year,) and located the same evening on their new stand[1], at a distance of a foot and a half (see what I have said at page 18) from the parent stock. Should the season be at all propitious, this swarm ought to weigh from 60 to 90 lbs. at the end of eight weeks' time, and yield magnificent swarms the following year.

Should it be ascertained, however, that the age of the queen-bee does not *exceed* two full years, and it be thought desirable that she should head the swarm, or if the swarm should issue after the 25th of May, (in which case the

[1] *i. e.* If the swarm appears *very strong;* otherwise, let it be treated according to the directions given in the ensuing paragraph.

prime-swarm might be delayed too long if the queen were destroyed,) when the bees have been quietly settled a few minutes in their new or larger hive, let the old hive be removed from its accustomed stand to some shady and remote part of the garden till evening, it being there tied up, and its inhabitants kept prisoners till then. The new hive should now be put upon a suitable board, and *made to replace the old hive.* The object of this proceeding is the strengthening of the new swarm to its utmost extent, *and the prevention of casting.* The former is not of so much importance the *first* year as afterwards, when, the apiary having attained its full and intended size, or nearly so, these *prime-swarms are to be broken up in the autumn, and spoiled of their contents.* At present the prime-swarm, I shall suppose, is intended to remain as a *stock* over the coming winter. The plan to be pursued with a view to strengthen it, (and even when the hive is to be kept, it may be strengthened with advantage,) is as follows:—About an hour before dusk the old hive is brought to the stand which it is intended permanently to occupy; here the bandage is loosened, when a rush of the imprisoned bees will take place, eager to enjoy the pure air after their confinement. *Many* of them, after a short flight, will return, but, not a few, instead of flying back to their hive, will go *to their former well-known*

quarters, now occupied by the new swarm. There finding their queen and friends, they will remain to increase the strength of the new swarm, by the welcome addition of their numbers. Nothing remains but to restore its hackle to the old hive, and to give a milk-pan to the new one,—this having *a flat top*, but not so the other. The pan should be elevated an inch from the top of the hive, by the insertion of a few stones, to allow space for a current of cool air between it and the hive, which will be very grateful to the bees, and tend to further the hive's prosperity.

Now in this case,—*i. e.* the substitution of the new hive for the old one,—in all probability no further issue of swarms will take place from the old stock, for the major part of the population having gone off with, or subsequently joined, the prime-swarm, there is every likelihood that the first-hatched princess will issue from her cradle before the population shall have sufficiently increased as effectually to control her actions, notwithstanding the large quantity of brood which is always left behind by the old queen. In this case, which will happen nine times out of ten, the newly-liberated queen rushes wildly about the hive, inflamed by instinctive impulse to a most vindictive rage, plunges her sting into every royal cell still occupied by brood, and destroys every rival, thus remaining undisputed mistress of the hive. Here, of course, no more

swarms will issue; but—and mark the advantage of this result—instead of a succession of miserable casts proceeding from the hive to trouble and annoy the apiator, and blight his prospects for another year, (which casting almost invariably produces, as the casts are in general worthless, and the old stock becomes too impoverished to survive the winter,) there will stand till the spring following the original stock, besides the prime-swarm, both presided over by young and vigorous queens, and having a teeming and youthful population.

In the former case, however, where the first-hatched princess of the year was forced to lead off the prime-swarm, (this being not located on the old stand,) a cast must certainly be looked for, which will probably issue from the hive two or three days after the first,—*i. e.* unless the first swarm was remarkably large. Instead of suffering it to stand as a distinct stock, I would advise it to be returned to its parent hive the same day. As, however, it would probably reissue the following day, (and every day so long as there remained any royal brood,) I would recommend the apiator, after hiving the cast in the usual way, to lift the old hive off its stand, turn it up in a pail, and *cut out every royal cell that he can see.* Owing to the probably small number of bees left behind, after the issue of the cast, the operation is a very simple and easy one. When

the royal cells have been removed, bring the cast in its temporary hive and turn it quickly bottom upwards in the pail, and set the old hive over it. The bees will immediately ascend up into it; nor will there be any further issue, especially if the junction be effected towards evening. It is well to perform the operation close to the old stand of the old hive, to which (when the bees have crept up into it) the hive may be removed; were the junction effected at a distance, it might happen that a good many bees would lose themselves in seeking for their home in its well-known locality, particularly if the old hive were not replaced till evening.

The old-fashioned bee-keeper will, I doubt not, object to the system here proposed, that it promises no nectar-spoil the first year, owing to my discouragement of casting; all scientific apiarians, however, are agreed in recommending either the return of casts, or their junction with one or more others. Of these two methods I decidedly give the preference to the former; and I think it stands to reason, that two old hives, (if still clean, and not too old as to their comb,) with a returned population of youthful workers and vigorous queens, will do far more, and yield a much larger profit in the end, than the united casts of these hives would do, together with the same old stocks, if preserved to another year,—seeing these will each have a weak population.

Moreover, the season must be bad indeed which does not see some surplus honey gathered by, and obtained from, the monster prime-swarm. Large though the hive may be, it will be found to fall short of the space demanded by the wants of the thronging and busy insects; the bee-master ought, therefore, about the eighteenth day after its establishment (according to the season), to withdraw the bung from the top hole, and place a large glass or cap over it, having a piece of comb fastened to its side by the application of heat, to tempt the bees up into it. Should a glass be preferred to a cap of straw, it must have a warm flannel covering closely fitting over it, to prevent the escape of heat: in very hot weather of course this may be removed, but put on again should a change of weather occur and a cold temperature prevail. A common bell-hive painted should be made to cover the glass or cap, surmounted by a neat hackle, projecting in part over the lower hive, as a protection from rain and sun. Should more room be wanted, which will be known by the thronging of the bees about the entrance, a low flat-topped hive should be introduced between the glass, already partially filled, and the hive itself; or else, if the hive have several holes in its crown-board, other glasses may be set over it, large or small, according to circumstances, which I prefer greatly to the piling of *supers* one over the other.

The next matter, which will claim the attention of the cottager, will be the removal of the honey-full cap or glass whenever that happy circumstance is ascertained, which may be known by seeing most of the cells that are visible ceiled in with a waxen lid. As soon as this is certainly known—if the glass or cap seems ready for spoliation on or before the 7th of July—another smaller glass or cap may be substituted for it. After that date it will be advisable to suffer the bees to fill their empty store-room in the hive below. The bee-master need not regret the transfer of the honey that may be collected after that time from himself to his bees, as after the middle of July what honey is collected is generally poor, and has often a peculiar flavour, far from agreeable. While, however, this honey will be of little value to himself, it is good enough for his bees, and a treasure to them.

The removal of a glass or cap, and the substitution of another in its place, is not a matter of much difficulty. The best time for performing the operation is towards the brightest part of a fine day, when most of the bees are luxuriating in the fields. This usually occurs about one or two o'clock, p.m. The apiator should be carefully armed against the possibility of being stung, as bees are often greatly enraged, especially if their hive receive any blow or jar in the event of the operation being awkwardly performed. The

actual removal of the glass is an easy matter. It is not from the bees who may happen to be in the glass, or at the hole in the top, that an attack is to be apprehended; the sudden admission of light at an unguarded point, where an invasion is least expected by them, seems so greatly to confound them, that they never attempt to fly, *except they are breathed upon:* this makes it very easy to remove a glass in a *bee-house*, where the in-and-out-flying bees cannot annoy.

A favourable opportunity having presented itself, let the bee-master proceed to his apiary with a fresh glass in his hand, a plate or dish large enough to hold the full one, a stout piece of thread, and a knife or spatula. After gently removing the hackle and covering-hive, the knife must be passed round the edges of the cap or glass so as to break the propolis which makes it adhere to the hive-top. Next let him pass the string, holding it with both hands, under the glass, to sever the comb above from its attachments below,—for it has generally a communication through the hole with the combs below. This must be done carefully, so as to destroy as few bees as possible;—care being taken also to cut the combs *from end to end lengthwise*, and not sideways or across, for fear of disengaging them from the sides, or crushing a number of bees between them, and so spoiling the honeycomb. The full glass should now be raised gently, yet quickly, off, and put in

the plate that was provided for the purpose, after which the fresh glass must be elevated over the hole in the place of the former, and its coverings restored as before. Should it be thought proper to give no more room additional, of course the straw bung will be placed over the hole, and the milk-pan covering restored.

Let the full glass now be removed either into the cottage or to some shady part of the garden, placed on a table, and covered over with some dark cloth or handkerchief for the space of thirty or forty minutes. By this time the imprisoned bees will generally be found in the greatest commotion, which is the best augury of success, for the queen-mother is known by this to be absent from among them ; it is a sign, also, in general, that there is no brood in the glass. As to brood, however, it is utterly unlikely that any will be found where the hive itself is a large one : the queen never breeds in a bell-glass, except when the dimensions of her proper dwelling are too contracted for her wants. Now, then, must the glass be turned bottom-upwards in the plate, it being still partially covered by the cloth. In a very few minutes every bee will have flown away. Care must be taken not to breathe upon, fumigate, or tap the glass, for this only diverts the bees' attention, and counteracts the influence of the *loyal instinct*, now all-prevalent. If left alone they will hie home with all speed, eager to

rejoin their beloved queen-mother. When the operation is performed in the house, the room into which the glass is taken must be darkened in every part, save only at *one open space* in one of the windows, through which the insects may fly out unimpeded; moreover, the window should look out directly upon, or not be far from, the apiary, otherwise the bees will be apt to return into the room to the annoyance of the apiator, being at a loss to find their way home. He must also be present most of the time until the glass is empty, for sometimes the bees will return with an accession of force, and rifle every drop of honey they can find. Should any symptom be apparent of an invasion of this sort before the glass is emptied of its contents, it must be removed elsewhere, and the bees imprisoned for a short space; but this will very rarely happen, except where the bee-master is most culpably negligent.

It sometimes happens, as I have hinted above, that the queen-bee is imprisoned among her subjects in the glass. If so—and it will be known by the comparative silence which reigns within, and the little disposition of the bees to fly away, as well as (though after a longer interval, and then not always) by the restlessness of the bees in the old stock—the glass must be restored to the parent hive till the queen is ascertained to have descended; or, better still, the queen may

be hunted for in the glass, and her person secured. In this case she might be destroyed, if found to be small in size, and thought to be old; but this must be done with caution, especially if the hive from which it is taken be intended for a permanent stock, *i. e.* to remain at least over the following winter; for a queen may often be lost from a hive without the bees ever perceiving it, in which case it must inevitably perish. If not destroyed, let the queen be put on the alighting board of the hive, into which she will speedily enter.

Where brood is found in the glass, if in any quantity, it ought to be returned; otherwise, the sacrifice of it is of little importance.

As soon as August is fairly over, it will be time to prepare for winter, by weighing the hives, and supplying any deficiency in the weight by a timely and liberal supply of food. The new stock ought to weigh upwards of 23 lbs. of *contents*, and the old one about the same, for the difference in age in the one case will about equalize, in weight of comb, &c., the difference in the other; *i. e.* if one hive contains old, and therefore heavy comb, the other will probably contain a greater abundance of pollen, as well as more comb, than the other. Should either hive weigh less than the figure above specified, (*and each ought to weigh very much more than this,*) feed copiously, and in the shortest possible

space of time, (in order that the exciting cause may be the quicker removed, when bees consume more food than usual,) either with honey or prepared food, full directions for the making of which will be found further on in this book.

The business of the apiary being now concluded for the year, all that remains to be done is to shelter the hives from the winter sun, should they be at all exposed to its influence. This part of bee-management, viz., the wintering of bees, has rarely been properly attended to[1]; and yet there can scarcely be imagined a more important duty of the bee-keeper. We have, indeed, had suggestions, many and various, from different quarters, as to the best method of wintering hives; but no certain or uniform plan, as the result of a careful trial of all available methods, has yet been put forward; and it is evident that no one can speak of any method being *the best*, until the various merits of such methods have been fairly tested. Some persons have successfully kept bees through the winter by burial under ground, while others have stowed their hives in cool barns and dry cellars with a like result, yet experiments of this kind have been isolated, and no certain inference can be drawn from them in favour of those particular plans as generally recommendable. One bee

[1] See Appendix, Note C.

master suggests the transfer of hives to the north-side of a wall or building, while a second (as Mr. Taylor) recommends their being sheltered from the sun by a large wooden screen placed in front of them, without removing them from their summer stands. In the present condition of our ignorance on the subject (for I cannot call it *knowledge*), I should advise a trial of these screens, *one to each hive;* or, better perhaps, (because *cheaper and less awkward,*) a double line stretched on poles, firmly fixed in the ground, and covered with *bass-matting*, might be made to protect several hives at once. Of the two former plans it is impossible yet to speak with any certainty, until their merits shall have been largely tried. I am in hopes, however, that some experiments, that are being instituted this winter at my suggestion (whose results will be given to the public shortly through the pages of the "Cottage Gardener"), will help us to arrive at some satisfactory conclusion respecting them. Nothing is more certain than that all hives become greatly weakened which are suffered to remain throughout the winter exposed to the sun's influence, for many bees will be lured out of their comfortable quarters to almost certain ruin, while an increased consumption of food takes place. Where a suitable locality is chosen, (*well sheltered,*) I am very much disposed to consider a permanent north or north-west

situation as presenting an aspect the most desirable for bee-hives; but time, and the increasing interest in scientific bee-management, which is rapidly developing itself, will assuredly disclose to us many truths yet only guessed at.

II. *Second year.*—The severity of winter no sooner yields to the soft influence of February zephyrs, than our little favourites sally forth in quest of nourishment for their young, many of whom, it may be, are already hatched in the hive. Warned by their drony hum (for it has a peculiar sound at this season of the year), the bee-master should pay an early visit to his apiary, taking with him a clean and dry bottom-board. The process of board-cleansing is another rarely considered duty of the apiarian, but not the less important on that account. To the neglect of this precaution is to be attributed the *ruin* of not a few hives by the wax moth, and the *impoverishment* of many more, annually. This insect is on the alert sometimes as early as March, if the weather is mild, and may be seen at morn and eve hovering busily around the hives. They lay a good deal in the interstices between the hive and the board, on that side where the latter is most thickly covered with the *débris* of comb (for they quickly scent it out), if this is not removed. Where the hive is well glued by propolis to the board, it is a question if the larvæ, when the eggs are hatched, can get in, on which

account it may seem a dubious good to break up the hives from their boards. If, however, these latter are frequently cleansed—and the oftener the better—no danger on this score need be apprehended; besides, the bees will be spared much labour. The best way to conduct this operation is, to substitute a fresh board for that of one of the hives, which may be cleansed and dried effectually ere it be substituted the following day for the board of the second hive, and so on throughout the apiary, where more than two hives are kept. The last removed board, after being thoroughly cleansed, may be laid by for future use.

While the above operation is being performed, a good opportunity presents for examining the condition of the comb in the old hives. Let these, therefore, be turned up, and any old, black, or mouldy comb, that may be visible, removed, taking care not to cut too deep into the hive, so as to injure the brood-comb actually occupied.

The next thing to be attended to is the *weight* of each hive, in which should there chance to be any deficiency, let a proper supply of food be given to the bees. This ought to have been effectually guarded against some months before; but if such attention was not paid to it, about half a pound of diluted honey or beer and sugar (see Chapter XI.) per week should be supplied to them, until honey is known to abound.

Besides the danger arising from a possible failure of food, there are other evils no less formidable to be apprehended, and various contingencies to be met as they arise. Should any of the hives, for instance, appear sluggish towards the middle or close of March, or even earlier; if the bees stay much at home, however apparently numerous; and little or no pollen is carried into the hive; (and two out of every three bees ought to return from the fields well laden with this substance;) mischief is certainly brewing within. This last, of all signs, is the most fatal. It is now all over with the hive's prosperity, and the sooner it is broken up the better. Either the queen is dead, or she has become worn out with age. In either case the bees, having reconciled themselves to their fate, live riotously on their stores while life lasts, or their store of honey remains. The best way to treat the hive under these circumstances, is to fumigate it with burnt puff-ball or *Racodium cellare*, (see Mr. Taylor's book,) and to unite the bees to the nearest neighbouring hive. As this is often a matter of trouble and difficulty, I would recommend the following plan to be adopted in conducting the process. When the bees are all at home blow into the hive, by the entrance, a sufficient quantity of smoke, till all is still within it. A few raps upon the hive will shake down a great many bees, which the

smoke itself, perhaps, has failed to disengage from between the combs. Now lift up the hive, and sweep the fumigated bees from the stand into an empty hive or other receptacle, together with as many bees as can be swept off the combs of the hive itself before they come to life again. This done, while one person sprinkles the fumigated bees with sugar-water, let another remove the old hive, and set it over a hole prepared beforehand, and filled with a few sulphur matches: afterwards, the combs may be cut out at leisure, without any annoyance from the not seldom speedy recovery of the half-fumigated bees. Before joining the fumigated bees to another stock, the population of both the hives should be sprinkled with a little sugared ale or *eau sucré*. To effect the junction, proceed as follows: after well sprinkling the fumigated bees, set them (in the common bell-hive) bottom-upwards in a pail; then take the full hive, also sprinkled with the preparation, and set it over the other; tie a cloth round the points of union of the two hives, and let them remain in this condition till the following morning early. Now remove the cloth, and set the full hive on its old stand, when the bees will be found to have harmoniously coalesced. The hives must not in any wise be meddled with during the time afforded them for amicably settling their differences. What honey is found in the fumigated hive becomes the spoil of the bee-

master; being probably considerable, he must console himself therewith for his loss.

Let us suppose, however, that both his stocks survive the winter and spring, and, on the approach of May, are in strong and vigorous health, and promise early swarms. Towards the end of April, his improved hive with the flat roof (the other, be it remembered, is still the old hive originally purchased, and has no hole; one, however, might be cut out of its top) must be furnished with a large cap or bee-glass, more particularly if there is any intention of returning the prime-swarm, with a view to get rid of the old queen; for, in this case, the interval which must elapse between the return and the re-issue of the swarm will be often so considerable, as to afford plenty of time for filling a fine glass, owing to the large and rapid increase of the population. In very good seasons, two glasses may be taken off.

And now swarming time, that most interesting of all seasons to the lover of bees, has, we will suppose, again come round, and his heart is elate with hope, while anticipating less disappointment than under the old system. The bee-master is now frequently about his hives, supplying water, shading from the sun, and watching the progress of his bees. The early appearance of drones is hailed by him as an especial augury of prosperity; and they may be seen in some forward

seasons so early as the middle of April. The carrying in of large quantities of pollen, also, is noted with infinite satisfaction.

Let us now take the case of the *old* stock, which swarmed the year before; this being smaller than the swarm which issued from it, and certainly containing a queen of the previous year, is the first to swarm, and that on or before the 25th of May. As soon as settled, the bees should be swept into the larger-sized hive, similar to the one used the year before, if it be intended to preserve it as a stock-hive to another spring; and the new swarm put in the place of the parent stock, removing this to a stand close by. The same treatment, also, will be adopted with the first swarm that issues from the other stock, should it have a youthful queen as the other, and be reserved for winter stock likewise. If, however, the queen was not destroyed the year before, but suffered to accompany the prime-swarm on its first issue, by all means let this be done now, and the swarm be returned to its parent hive till the emancipation of the oldest princess. This will not take place for at least a week later, therefore give additional space for working at the top of the hive; it will not delay the swarm's issue a single moment.

If, however, it be deemed suitable to increase the apiary by slower degrees, and *one* additional stock only be reserved for winter keeping, the

swarm from the second stock *need not have its queen destroyed.* Let it, in this case, be put into one of *the smaller-sized hives*, (see Chapter IV.,) and located on the old stand, as in the instance not long ago specified. It will thus derive a great accession of strength, owing to the constant resorting to it of many bees from the old hive, who, on returning from the fields, will, in considerable numbers, bend their flight to their old homestead [1].

This swarm must have additional room furnished to it within a week of its establishment, by placing a *super* of exactly the same dimensions over the hive itself; it may, indeed, often be requisite to give this before, as when the season is very favourable or the swarm unusually large. If these hives are carefully fastened together, well painted, surmounted with a milk-pan, and carefully shaded from the sun, they will require no more care till the spoliation season comes round. One or more glasses may be taken off in the course of the summer from the old stocks and the first swarm; but the apiarian will look chiefly for his *spolia opima* to the second prime-

[1] I need not repeat here the instructions already given in the early part of this chapter for the management of the *parent* stock after this issue of the prime-swarm; suffice it to say, that no casts ought, on any account, to be suffered to stand as independent stocks; rather let them be returned to their parent hives on the same day of their issue, after a careful excision of all the royal cells which present themselves to view.

swarm, if he does not intend to keep it over the coming winter.

Let us suppose the autumn arrived. His bees, perhaps, have all thrived well. There stands the original stock purchased the year before; also the swarm which proceeded from it the same season; and the two swarms obtained from these hives in the current year. Should the bee-keeper intend to break up his oldest hive, (which he might do advantageously,) *both* his prime-swarms ought in this case to be preserved, and to this end they should have been put both of them into the largest hives. But if one of them was put into the smaller hive, with the *super* added to it, with a view to plunder in the autumn, in this case the old hive may be kept, (unless *two* hives are considered a full complement for the apiary,) after cutting out of it one or two of the oldest and dirtiest-looking combs. In either case the bees should be preserved, and be given to their neighbour stocks. The plan to be pursued is this; and first where the *old hive* is to be broken up:—

Towards dusk on a calm warm evening proceed to the apiary, accompanied by a well-armed assistant, taking with him the following articles:—a good-sized table-cloth, a bucket or pail, a low stool, a good length of strong twine, an empty hive of the same diameter as the hive to be operated on, some sulphured feathers and

matches, a spade and a couple of stout sticks about a foot long. These are the implements which I have found useful in conducting the process of *driving*.

Business is opened by planting the bucket firmly on the ground, within a yard or two of the doomed hive, which ought some hours previously to have been broken up from its board, and elevated an inch above it by some sticks thrust underneath it, with a view to force the bees up among the combs by means of the current of air which is thereby admitted across the floor-board. The cloth must now be held by the assistant unfolded in such a manner, that when thrown over the hive, its centre shall rest on the top of the hive, while the string lies untwisted close by the bucket ready for use. Every thing being in readiness thus far, the apiator gently, but quickly, lifts the full hive off its stand, and arranges it bottom-upwards in the bucket. The empty hive with equal celerity and care is then lifted over the reversed stock, and adjusted as accurately as possible to the up-turned base of it, so that the two hives exactly coincide[1]. On a signal

[1] If not *equal* in diameter, the empty hive may be rather larger, but on no account smaller, than that of the full hive; otherwise, ten to one the bees will refuse to ascend, preferring, together with their queen, to adhere obstinately to the intervening ledge. A hive with a few combs will tempt them up readily.

from the chief operator, the assistant quickly throws the cloth over the top of the hive, upon which one of them seizes the string and proceeds to pass it several times round the hives, just *at*, *above*, and *below* the points of junction, taking care to tie it in a *bow*. A particular attention to these *minutiæ* will save the managers a great deal of trouble, while it will ensure complete success. This being done—and if done nicely not a bee will have escaped to annoy the operators—let one person hold the hives steadily, so that they may not slip apart, while the other seated on the stool provided for the purpose, commences a smart, quick, and regular, but not too violent, drumming, against the sides of the *reversed and full hive*, (and *this alone*,) with the sticks above-mentioned. An alternate series of drummings, with intervals of cessation for a couple of minutes at a time, will soon disturb the population within, and compel the bees to ascend into the empty hive after their queen, who is generally among the first to move. The ascent, which is always accompanied with a loud buzzing sound, is frequently effected (as in the case especially of a strong and full stock with a vigorous queen) within five minutes of the first commencement of the drumming; sometimes, however, it is delayed for many minutes. The operator will soon learn the fittest time for removing the upper hive after a little practice: the novice I would advise

to wait some ten or fifteen minutes after the first great humming is over. He may continue tapping at intervals against the bottom hive, *but very gently*, or the bees, which had already gone up, might descend, as I have more than once known the queen do. When the bees are perfectly quiet, the cloth must be unfastened and gently removed without shaking it, else the bees, which may happen to be imprisoned in it, will be flying about in all directions to the dismay of those present. Now let the top hive be quietly taken off, and placed on some stool or table without jarring it, till what few bees may be left in the old hive have been fumigated with brimstone after the old fashion. A very little sulphur will suffice in this case, as the fumes will quickly pervade the hive now thinned of its population. After removing the old hive in-doors,—where the combs may be cut out immediately,—attention is turned once more to the expatriated bees. If the nearest hive to their old stand (to which they had best be joined,—as but few, if any, will lose themselves in seeking their old habitation) have a flat top, let its coverings and bungs be removed, and a piece of perforated zinc be spread over the hole or holes; the temporary hive may then be set over it, and every cranny effectually closed (by which the bees might escape) with a little clay, when the smell of the two swarms will so amalgamate, that, on withdrawing the plate six or more hours later, they will

be found to have peaceably united, after a contest for sovereignty between the two queens. At the end of a week,—or earlier if it can be ascertained that the bees have all descended (up to which time the clay stopping must on no account be removed from the upper hive)—the top hive may be taken away altogether. Should any bees be still found in it, let them be knocked out in front of the hive to which they have been joined, and they will speedily fly into it. If on falling down they seem to congregate in a mass, and do not return to their new home, their queen, it will be conjectured, probably with truth, is still among them: let her be sought for and killed, upon which the bees will soon disperse and fly away.

Where the nearest hive has no flat top, (or rather, *hole at its top*,) let one three inches square be neatly cut out of it with a sharp knife, and a cap of perforated zinc be fitted over it. After suffering the temporary hive (carefully clayed up) to remain in this way for a sufficient time—say till the following evening—it may be gently lifted up, while the zinc cap is removed from the top hole of the lower hive; let the hive then be replaced as before till the end of the week, and treated according to the directions above given.

This plan of effecting unions of bees is, perhaps, the simplest and most effectual of any. We are indebted to Mr. Walond, late rector of Weston-under-Penyard, Ross, a diligent api-

arian, for the important discovery, (which I have frequently verified,) that if a piece of perforated wood or metal be introduced between two hives set one above another, the smell of the two families will commingle in such a manner, that the bees will shortly unite in harmony and become one family, thus showing that these insects recognise friend from foe by *smell* alone.

It will sometimes happen (though very rarely) that no drumming will induce the bees to ascend into the empty hive set over them. When this is the case, either there is but little comb in the reversed hive, or the bees are few in number, or their queen is weak or dead. In the latter instance (and, indeed, in every instance where the bees to be preserved will not ascend) recourse must be had to fumigation. Where stocks are thin in population, or only half full of comb, driving will rarely succeed, and then only after much trouble. Under such circumstances the only way to dislodge them is by the use of some narcotic. As soon as this has been effectually employed, and the bees are collected in a glass or bowl, let them be sprinkled with honey or sugar-water; this done, (but see page 53,) reverse them on a perforated zinc plate, and set them over the hive to which they are to be joined. The plate may be withdrawn in a few minutes and the junction effected. Perhaps it is useful to blow a few whiffs of the same narcotic used in fumigating

these bees in at the entrance of the hive to which they are to be joined, as in the instance already explained. I cannot say I am an advocate for fumigation *where it can be avoided*, for I have always found it a dirty, tedious, and troublesome process; but many as strongly advocate it,—and there are times when bees can be saved in no other way.

If the old hive is not to be plundered, but reserved for stock to another year,—should it be more than *four* years old,—it will be advisable to cut away part of the comb, which is now getting black and old. To effect this, let the bees be driven out according to the method just explained. When driven, and taken off the old hive, proceed to cut out the two middle, or blackest-looking combs, about three-quarters of the way up,—*i. e.* until the cells are reached which contain honey, for this ought by no means to be removed. Should the weight of the hive be great, the lower part of more than *two* combs may safely be cut away, provided that no brood is sacrificed in so doing. If the combs appear still full of brood, the process of comb-excision must be deferred until the young bees are all hatched out; indeed, the process of comb-excision, on this account, should be generally delayed till the end of August or the beginning of September, when the lower cells will be found empty, for the most part, of both honey and

brood. After cutting out as much comb as is thought advisable, the bees may be re-driven into their old domicile, where they will soon put things to rights, and, perhaps, make some fresh comb before winter,—but if not, the *vacuum* will do no harm. I have known bees construct comb under these circumstances after the 24th of September, when they had been so treated. I need only observe, that a hive renewed in this manner by a periodical excision of comb may last in good health and full prosperity for as many years as the straw itself will last.

The method of dealing with a *spoliation-swarm* is as follows. The top or *super*-hive should be taken off not later than the first week in August. The plan to be pursued in its removal is in all respects similar to that already explained at full, where the first glass or cap had to be taken off the former year. Nor should the plunder of the main stock itself be delayed much beyond this time, except where the surrounding country affords much autumn pasturage for bees, in which case, also, the *super* (if not full) may be kept on a fortnight or so longer. Where the queen is still vigorous, a good deal of brood may yet be found in the lower hive, on driving the bees out of it, at the period of deprivation. If so, after uniting the bees, as before directed, to the nearest stock, and cutting out each comb carefully, I would recommend the part contain-

ing the brood to be separated, and to be placed over the stock to which the bees have already been added. In order to effect this, let the bungs be removed from the top of the hive, and set a plate of zinc over the holes; next adjust the brood combs in an empty flat-topped hive *turned bottom upwards*, (from which the bungs have previously been removed,) in such a manner. that the bees, on being admitted to the combs through the coinciding holes of the two hives, shall be able to get at every cell,—in order to which, the combs must be so arranged as not to lie flat against each other. Now cover this over with an empty bell-hive pushed down over it, and withdraw the zinc plate; the bees will shortly ascend, warm up and hatch out the brood with their accustomed care, after which, at the end of three weeks, the top hives may be removed, and every thing set in order as before.

For *autumnal* management in general, in respect to weighing and feeding up of stocks, I refer the reader to what was said earlier in the chapter, under the head of the first year's treatment of the apiary. It remains for me to add a few words on the selection of *breeding* stocks to stand the winter. My plan is—and it is a plan I would earnestly press upon the bee-keeper's notice—*to keep the same stock on from year to year*, so long as the hives themselves are sound and uninjured; and, if properly painted every year,

having also a wooden hoop at bottom, they will last full fifteen years and upwards. My reasons for recommending this unusual plan are as follows:—*First*, that these stocks have always young queens, and a more youthful and vigorous population, if they have swarmed *once, and only once*, in the preceding summer; and *secondly*, that the bee-keeper's honey-harvests, being gathered from virgin hives, and fresh combs, will be so much more abundant and valuable owing to the superior purity of the honey so obtained. Is it objected to this system of management, that the old hives, by reason of the age and foulness of their combs, will become less and less prolific and healthy every year? I answer, (and the reader will be prepared for my answer from what has been already written,) that *every autumn*, not later than the end of September, one-fourth or one-fifth of the combs in each hive (*i. e.* the lower part only to the depth of six or seven inches; for the upper part is rarely used for breeding purposes, and therefore lasts a longer time) must be cut away, so that all the combs in every breeding hive shall be *renewed once in every four or five years*. By this means a stock will maintain itself in perpetual youth and vigour, so long as straw and binding will hold together. Mr. Taylor, following De Gelieu's practice, advises excision of comb in *spring* (February or March); to this I entirely object, chiefly because

of the weakness of bees at this season, and the extreme hazard attending any such operation at this critical period. It is true, the bees are confined to one part of the hive, and nothing is more easy than to cut away almost any quantity of empty comb—empty, that is, of *brood*. But these, perhaps, are (as is generally the case) the main *honey-depository* of the hive, and possibly the freshest combs, which it is least desirable to remove, which may have been renovated the year before; while the combs among which the bees are congregated are full of eggs or brood, and cannot be meddled with on any account. It is, however, good practice to turn up the hives in February, and cut away any mouldy or moth-eaten comb that may be seen.

To sum up, I think every one will acknowledge at this point, that the system of bee-management advocated in this chapter is superior to most others at present in vogue, on the ground of simplicity and profit[1]. Its peculiarity consists chiefly in four points, which I conceive have not hitherto been combined in any system. 1st, the perpetual maintenance of a youthful and vigorous race of queen-bees; 2ndly, the entire suppression of all after swarming; 3rdly, the yearly plunder of the prime-swarms, instead of keeping them as winter stock; 4thly, the pre-

[1] See Appendix, note D.

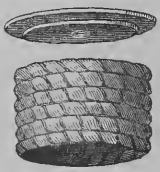
servation of the same stocks, for swarming purposes almost exclusively, from year to year. It does seem passing strange, that in the management of our bees on the *cottage* plan, we should year by year have systematically destroyed our young queens, and preferred, with more politeness than self-interest—with more politeness than is generally to be found in us lords of the creation towards our dumb fellow-creatures—to give up to the bees the free enjoyment of their more delicate stores, while remaining content ourselves with the more worthless and less wholesome kind!

CHAPTER VI.

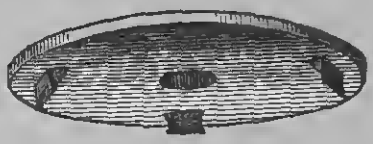
OF HIVES OF STRAW, SUITABLE TO AMATEUR BEE-MANAGEMENT.

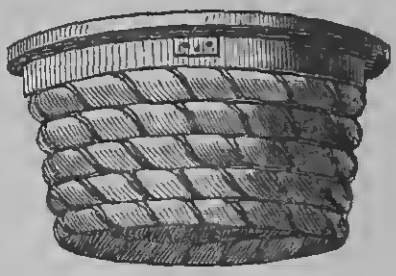
I HAD originally introduced the subject of this chapter among the observations on cottagers' hives, with which the reader has already been made acquainted; but it has since occurred to me that it would be better treated of in a separate chapter, as an introduction to my suggestions to the amateur. The fact is, however suited Mr. Payne's hive may be to the pockets and capacities of the humbler class of bee-keepers, owing to its very slight deviation from the hive in common use, it undoubtedly yields the palm of excellence by a great deal to the Huish or Grecian hive, as modified by Mr. Golding, (which I consider the *ne plus ultra* of bee-domicile,) and even to several other kinds of hives less perfect than Mr. Golding's. Should any person, therefore, consider this hive (and it need not be constructed at any very great expense) better adapted than the former to improved bee-culture among the poor, and feel desirous of introducing it into common use, let him by all means recommend it in preference.

Before I come to treat of Mr. Golding's hive, I must say a few words in favour of a hive of Mr. Taylor, which he recommends in the fourth edition of his work, and of which he has given a sketch. Its peculiar advantage is, that, simultaneously with the removal of the top, every comb can be lifted out of the hive, as well as any partial deprivation of honey made. The hive is open at both ends alike, and it has a moveable crown-board of doubled wood, each piece being not less than three-fourths of an inch in thickness. There is a four-inch hole in it, or, (as Mr. Taylor suggests,) if preferred, two or three smaller ones. It will be observed, on referring to the sketch, that the lesser and under part of the crown-board is cut away, so as to fall *within* the diameter of the hive; the upper part being made an inch or more larger in diameter, so as to rest on the topmost band of the hive. My own hive of this principle is, I think, somewhat an improvement on the above. The crown-board, —which, like Mr. Taylor's, is constructed of two pieces of well-seasoned wood, planed smooth and glued together, (the grain of the wood in one piece crossing the grain of the other, to prevent warping,) and having a four-inch hole in its centre,—is not made to fit *into* the hive's *inner*



diameter, but the two pieces of which it is composed being made of exactly the same diameter, they *together* rest on the upper edge of the hive. This double-board also projects over the sides of the hive an inch or more. There are two ways of fastening it to the hive; either by passing three or more long thin screws (well greased, to facilitate their removal) through the board into a stout hoop of two or three inches in breadth, (which must be made to surround the upper part of the hive,) provided this hoop be thick enough; or by the use of hinges, or rectangular pieces of iron, of which one leaf is screwed to the under side of the crown-board, and the other to the outer side of the hoop. Two or three of these will serve to keep the top firmly in its place, assisted by the milk-pan cover, and their cost is a mere trifle. Besides the hoop of wood just mentioned, (which I prefer to Mr. Taylor's external band of straw,) there should be a second hoop, half the breadth of the other, worked into the lower edge or base of the hive. The method of arranging the top here proposed, gives many of the advantages, at the same time that it avoids the extra expense, of



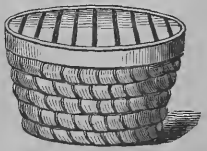


Mr. Golding's bar-hive. When it is desired to get at the interior, all that is requisite, after driving out the bees, (temporarily or finally,) is to pass a long knife or spatula under the crown-board all round, thus severing the combs completely from it; after which, the screws at the side being withdrawn, it will come off at once. The peculiar shape of the hive, supposing it is intended as a substitute for Mr. Golding's hive —*i. e.* wider at one end than at the other— renders something of this sort necessary, as the combs cannot otherwise be got out entire, neither can any partial deprivation of the honey take place, which will often be desirable after a good season[1]. It is evident, also, that by this contrivance no more comb need be removed from the hive than is absolutely wanted, whereas, if it were attempted, according to the old plan, to

[1] I think, as a general rule, not more than from 20 lbs. to 23 lbs. of *honey* should be allowed for the winter provision of a stock of bees. *More* than this they are never likely to require; and what surplus they have, if in any quantity during the month previous to the swarming season, is merely an incumbrance, occupying room that ought to be taken up with young grubs; on which account its presence may be considered a positive evil. Supposing, therefore, a hive intended for winter stock should attain to the weight of 50 lbs. *contents*, of which 42 lbs. is reckoned to be pure honey, as much as 16 lbs. may be safely removed, *but not more*, as some few pounds are sure to be wasted in the process of deprivation, or subsequently by the bees secreting wax; for they will make an attempt to replace the combs immediately.

partially deprive a stock, in order to get at the honey, the whole of a comb must needs be cut away, and much of it wasted. Now, on the contrary, it need not be even severed from the sides; but, after cutting out a sufficiency of ceiled honey-comb, say two or three inches deep, the lower part may be left with advantage a clear gain to the bees another year, who will quickly fill up the vacant space.

It is certain, however, after all, that no hives can equal, much less surpass, Mr. Golding's modification of the Huish or Grecian hive, which gives to the apiarian the most perfect command at all times over every movement of his bees. I would strongly advise the amateur, therefore, to use this in preference to every other bee-domicile, if he have a just confidence in his skill and courage. Hives of this sort should, however, be constructed of two separate sizes, as those already described by me in Chapter IV., with one end of the hive an inch wider in diameter than the other. The bars, of which there may be about eight or nine, are affixed to, and rest upon, the uppermost band of straw, at the *broader end* of the hive; they should be distant about half an inch apart, each being three-eighths of



Mr. Golding's hive.

an inch in thickness, and one inch and one-eighth broad. They are kept in their places by small pegs of wood, or iron brads, one inch and a half long, which penetrate the straw at each end of the bars. A band or hoop of wood, as in the former case, encircles the upper part, firmly attached to the hive, but (unlike the former) projecting three-eighths of an inch upwards, so as, in fact, to be on a level with the bars, in order that the crown-board, which may be of wood or straw, *with a large hole in it*, may rest flat upon all. This, as in the former instance, will be screwed to the hoop, whether by the use of hinges, or long and well-greased screws let perpendicularly through it into the hoop. The crown-board also must be of *doubled* wood. A little nicety is required in the careful adjustment of the several parts of this hive, but this will be readily attended to by an intelligent workman.

As soon as constructed, every sort of straw hive should receive two coatings of *thick* paint, and be laid aside till wanted. It need hardly be stated, that all hives likely to be wanted should be got ready early in the year, that the smell of paint may quite go off before use, as bees are not unapt to leave newly-painted hives. Every winter should see a fresh coat of paint given to all the hives in an apiary; this will materially tend to their preservation for a good many years. As a sequel to these instructions, let me add,

that a sufficient stock of both sizes must be kept constantly on hand, to be in readiness at any moment; those of either size being made of exactly the same diameter, particularly at their *base*, for facility in driving. There will, of course, be required a greater number of the smaller size, two of which are necessary to each summer or spoliation colony.

These are the only hives that I at all recommend for an out-door apiary. Of the use of *boxes* in such a situation, even by the amateur, I cannot speak too deprecatingly, save only of the very ingenious double bar-hives of Mr. Taylor's invention: their expense, however, will ever prove a serious objection to their general adoption; and I am disposed to question even *their* perfect suitability to stand the vicissitudes of our English climate, with comfort to the bees, and profit to their owner. It is universally allowed that Mr. Nutt's hives have proved a signal failure, wherever located in the open air; in proof whereof, it is only necessary to point to the infinite modifications which the principle of their construction has undergone to suit each person's experience, and to remedy its thousand inconveniences and defects. And I think, if the truth were known, many a complaint has arisen, and will yet arise, against even Mr. Taylor's hives of wood. It stands to

reason, that wooden boxes, unprotected by a bee-shed, are both too cold in winter, and too hot in summer, for an exposed situation; hence the almost universal outcry against them throughout the length and breadth of the land.

CHAPTER VII.

OF THE AMATEUR SYSTEM OF BEE-MANAGEMENT IN THE OPEN AIR.

In the fifth chapter of this volume, where I entered into a detail of the cottage system which I approve and advocate, it will have been observed that I have studiously ignored and carefully avoided to recommend the non-swarming or *depriving* system, as it is practised by many of our scientific apiarians. I have done so advisedly, from a persuasion that it is wholly unsuited to cottagers in general; indeed, how often does the ingenuity and skill requisite to its successful management baffle the best endeavours even of the better instructed amateur to master it! Not only so, however, I cannot say that I am disposed, under any circumstances, to advocate the depriving system, *in its integrity*, as adapted to *out-door* apiaries. The situation must be very snug indeed—the shelter from storm and wind most perfect—which will effectually remove the anxious fears of the owner of a tripled or quadrupled storified colony during the prevalence of a strong gale. There must be a perpetual vigilance on his part, lest some un-

toward and unforeseen accident should arise to mar his hopes by endangering his aspiring structure. If even Mr. Taylor's bar-hives are scarcely proof against misfortune, how much less so are the not seldom ill-arranged erections of straw which one generally sees! Certainly the novice should have nothing to do with them, except he have a bee-house in which to place them. Whether to the amateur or cottager, therefore, who may prefer, from whatever cause, the establishment of a garden apiary, my advice is the same:—be content with a modification of the depriving system, similar to that already described, it will be found a much safer and more easy method of bee-keeping; nor am I certain that such a method would be found a whit less productive and remunerating than the much-vaunted non-swarming system. The glasses which may be filled by his populous stocks before swarming, and the produce of his yearling or spoliation swarms, will, I am persuaded, be found as great, or nearly so, as if he had piled box on box or hive on hive[1]; while he will be able to maintain his

[1] It will possibly, though *very rarely*, happen, that the use of a *third* hive may seem requisite, as when the season is remarkably good, or a swarm unusually large. So averse am I, however, to resort to this, that I should rather advise the use of a *super* of the larger sort, instead of the smaller size, (as recommended for spoliation swarms,) which would no doubt fully meet every emergency. It should be set over the swarm shortly after the bees have begun to work in earnest.

stocks in perpetual vigour, which the advocate of the depriving system will hardly be able to do, except at a disadvantage.

The plan, therefore, which I am about to recommend in this chapter to the especial notice of the amateur is not diverse in its main features from that suggested to the cottager. It is the same in respect to the size and shape of the several sorts of hives, differing only in the use of bars and a moveable top; it is the same in its apparatus of shelter from the weather; the same in the after treatment of casts and swarms; the same in the selection of winter stock; in the system of comb renewal; of changing and cleansing of boards; of winter protection; of harvesting honey, &c. &c. In these general matters no different plan do I now propose: both systems have similar features of simplicity and economy of management thus far, while both promise equally well in the matter of profit.

To the amateur, however, whose intelligence we may suppose to be of a higher kind than that of the cottager, and whose facilities for carrying out interesting and delicate experiments are greater, owing to command of time and opportunity, I would suggest the management of his swarms according to the *artificial* system, by which, if I mistake not, he will gain several very important advantages. I am aware that, how-

ever I may have been patiently followed up to this point, my book is now in danger of being condemned by the old-fashioned and stand-still bee-master, who, true to the character which Horace gives, is now, as in ancient times, a "*laudator temporis acti*," whose prejudices are ever prone to carry him back to the days of his great-grandfather, instead of forward to the improving age of *more experienced* posterity. Nevertheless, I persist in my recommendation, being convinced of its practicability and value.

That a process so obviously advantageous as this, if it can only be proved feasible in general, and successful as feasible, should yet have been so little noticed, or its probable uses so little tested, is a matter of no small marvel to me, especially when we consider that most bee-writers have professed themselves acquainted with it, and we have not been wanting in apiarians of scientific attainments, animated by a spirit of curious inquiry. De Gelieu tells us, that in his time the practice of artificial swarming on a most elaborate principle was common enough in Germany at the close of the last century—thanks to the industry of M. Shirach in propagating his views and system of bee-management—so that persons bred up to the business used to wander about from village to village, in the season, managing the considerable apiaries of the country people in this way. This proves

the recognition of the value of the principle by the Germans, and I see no reason why it should be unrecognised among ourselves. If the Germans found their method of conducting the process answer, and were not deterred from adopting it in spite of its complexity, why should it be too difficult for us? Moreover, the process has become so simplified of late years, that the veriest novice can understand and manage it.

I believe we are indebted to Bonner, the celebrated Scotch apiarian, for having first introduced the subject to public notice in England. His work was reviewed by Keys, who makes some passing observations on his particular method, and acknowledges its ingenuity. Keys himself, who was on the point of publishing the second edition of his book just as Bonner's work issued from the press, has given us two methods of forming artificial swarms, in such vague language, however, (as sufficiently betrays his practical ignorance of what he wrote about,) that he has most justly pronounced against them, that "they are inapplicable to general practice." Bonner's method was far more "ingenious," as Keys allows, and, indeed, it may be considered the original of the method hereafter to be detailed. To this must yield even the plan advocated and recommended by Dr. Bevan, a great authority in most apiarian matters. Bonner's plan is the foundation of the method which

appears to have been practised with much success by the late Dr. Scudamore, a physician of Canterbury, who wrote a little book on the subject of artificial swarms not long ago, which has seen two editions, and to which I acknowledge myself indebted for the outline of the plan recommended in these pages, and of much of its detail. His pamphlet, though small, is exceedingly to the point; and I think all scientific apiarians owe him a debt of gratitude for that little work. The result of my experience during the summer of 1850, when I assisted in forming for myself and others some seven or eight such swarms, in accordance with its instructions, has convinced me that the artificial management of an apiary (if it may be so called) is perfectly easy, and may be had recourse to most successfully, although not every instruction given in that book is to be absolutely relied on or followed. A modification of it, however, will, in the hands of a spirited bee-master, be found very successful. I am not at all sanguine, however—desirable and extremely interesting and profitable too as the process may be—that it will become generally adopted, at least, for a long time to come, if we take into consideration the considerable acquaintance with the economy of the hive and the habits of bees, which is necessary to success in this matter; when also we know that the great majority of bee-

keepers in this country are about as ignorant of what passes on in the interior of a hive as of the occupation of the man in the moon. In the case of any emergency arising, (and it need not be a very uncommon one,) most bee-keepers are at fault. Hence, old Bonner's observations were perfectly true, that, however "profitable the driving of bees to make artificial swarms may be, when properly performed by skilful bee-masters, yet it always has been, and ever will be, destructive to bees if performed by unskilful persons." I would wish it to be clearly understood, therefore, that I by no means recommend the indiscriminate adoption of this practice by those who are still in the infancy of their knowledge of the bee-art. This chapter must be considered as addressed esoterically to the initiated, or at least to those who are passionate admirers of the honey-bee, and these are not usually such as are contented to remain on the threshold, as it were, of their favourite recreative pursuit.

To proceed then :—the best time for the formation of artificial swarms will depend upon two things ; *the state of the season*, and *the condition of the stock to be operated upon.*

When the spring is early and the weather propitious, a swarm may be forced to issue, without danger to the prosperity of either swarm or parent hive, so early as towards the close of April.

Instances are on record of the issue of *natural* swarms as early as this; and nature is no bad guide to follow in our imitation or conduct artificially of any of her processes. But the season must be remarkably forward, indeed, which witnesses such an occurrence in this country, or else some defect will be found to exist in the hive whence the issue takes place: whether from the existence of the wax-moth, the presence of very old comb, or some similar cause. Neither when such does occur is it often that the bee-master can congratulate himself upon the circumstance, for it is not the earliest swarm which is on that account the best. Whatever the bees may do naturally, however, I should recommend the forcing of swarms artificially to be delayed till after the second week in May under *any* circumstances, because of the well-known fickleness of the season at that period of the year, and the chances of starvation and other evils endangering the very existence of both issued swarm and parent stock from chilling rains or blustering weather. Indeed, it is better to wait till after the *third* week of this month is over, (except in a remarkably fine and early season,) even though the stock should appear otherwise ready for it. I have observed that very early swarms, even in May, do not in general prosper so well as those that have proceeded later in the month. It would seem as if, the first

anxious start of the hive having been checked by unseasonable weather, the bees' ardour had become cooled and their spirits discouraged, so that on the return of really propitious weather they have no heart to work with the same diligence as other swarms which have issued in the very midst of the busy season. Perhaps the most suitable time of any (other things considered) presents with the first considerable collection of honey. As soon as the weather from being cold or chilly has changed to a temperature of a close thundery nature, when honey is sure to abound, (at which time every good stock will about have reached its climax of vigour for the year, though this does not usually take place till towards the end of May,) let the operation be performed if the bees have not themselves swarmed naturally. I lay great stress upon waiting till this moment, if circumstances allow the bee-master to wait so long, because no sooner does honey abound, than the bees greatly slight the queen's convenience. She is still, it may be, as desirous as ever to lay her eggs (nay, perhaps more so,—for I am not one of those who think the queen-bee relaxes her deposit of eggs after what is called her "great laying" is over); but another instinct besides that of preservation of their species occupies the bees' attention, viz., that of preparation for a day of scarcity, so that in the all-absorbing search for and storing of

honey, the breeding space of the hive becomes rapidly contracted[1]. It is evident, therefore, that now, on the eve of honey gathering, is the most suitable moment for the forcing of artificial swarms. Every comb is at this time full of brood, *which will ensure the after prosperity of the hive*, while such an abounding population has been hatched already, as to hold out the prospect of a rich autumn spoliation of the early one.

The criterion of preparedness for experiment on the part of a *stock* is various. First, there must be an abounding and vigorously-working population, thronging the entrance in warm weather,—sometimes it may be hanging in clusters from the alighting-board[2]; and secondly,

[1] See Appendix, Note E.

[2] The clustering of bees outside the hive—though it may sometimes occur immediately on a change of weather, as from cold to heat—usually takes place gradually, and some days after the occurrence of the change. It is a sign in general that swarming, whether artificial or natural, has been retarded too long, or, at least, that the former should be had recourse to immediately. If the plan of forcing them be adopted, as recommended above, great care must be taken in manipulating the parent hive, for the temperature of the stock, under such circumstances—it being densely filled with a teeming population—is usually very high, on which account there exists much danger of the combs giving way. If, therefore, a hive has been suffered, from neglect or other unavoidable cause, to proceed to this condition, and the bees hang out in great numbers, perhaps Dr. Bevan's plan may be had recourse to in preference to any other

the presence of drones is requisite in considerable force. As soon, indeed, as it is ascertained that

method. "Towards noon of a fine day, (says that celebrated apiarian,) or almost at any time, let the stock-bive be removed to a distance, and a spare hive (such as a Golding's bar-hive) be put in its place, to one bar of which (taken out of a similar bar-hive, if there are any such in the apiary,—a fresh bar being given to the stock from wbich it was taken) is attached a comb containing worker-bees' eggs, or very young larvæ of tbe same order, (but there should be *eggs* in every case, I tbink;) the out-liers, or the bees that are abroad, or both, as the case may be, will then enter tbe new habitation, cluster round the brood, construct one or more royal cells to inclose one or more of the eggs to raise a young sovereign. If the season be favourable, they will thus form a flourishing stock, whilst the old removed family, with beneficially diminished numbers, will soon be reconciled to their new situation, and attend to their usual avocacations as if nothing had happened." Or still better, perhaps, (because the removal of a whole comb from another hive might check its tendency to swarm,) I advise tbe use of a bee-glass, four inches in diameter, into which a piece of worker-comb is introduced, set over the hole at tbe top of the new hive. The process of rearing a queen artificially before tbe eyes of the bee-master, will form an interesting feature in the apiarian *memoranda* of tbe year. Dr. Bevan continues: "The brood-comb, which should not be less tban two or three inches in diameter, may be supplied from any hive that can spare it; but if not taken from a loose-barred hive of suitable dimensions, it may be separated from its original attachments," *i. e.* cut out of any comb in any hive, and adjusted any how in the bee-glass, or against the side of the hive whicb the new swarm is intended to occupy. The bees will soon glue it firmly in its place with wax and propolis. If this method of artificial swarming be adopted, the new stock so made, *having a young queen*, should by all means, if heavy enougb, be preserved to anotber year. In this case, tbe old hive, if it be a Grecian one, should imme-

these exist in any number in a hive, even if still unhatched, the operation may be performed without fear of ill success, although, to insure the *full* prosperity of both swarm and parent stock, (especially the *latter*,) a good many of them ought first to be seen coursing about in the open air, which they will be sure to do in the middle of every warm day, some time between the hours of 10 A.M. and 4 P.M.

The desirableness of delay till these appear in sufficient numbers, is based on the following considerations. It is known that in general, about the 20th day after the queen has begun her great laying of drone eggs, the bees, if they deem it necessary, (either from foresight of her majesty's approaching end, or of the probability of an excess of population over the hive-accommodation,) commence the foundations of royal cells, into each of which the queen, if her judgment coincides with that of her subjects, deposits a female egg, with a certain interval between each. The first royal egg, however, is seldom laid till many drones are preparing to leave their cells, often not till some have actually appeared in the open air. The reasonableness, therefore, of waiting till at least a week has elapsed after

diately be surmounted by a spare *super* or large bee-glass, and be treated in the autumn as a yearling swarm. Should it show symptoms of swarming, drive out the bees, cut every royal cell away, and return the population.

the first appearance of drones, before compelling the issue of an artificial swarm, is at once evident, as it is desirable that one or more royal eggs should at least be *laid* in the hive before the queen-mother leaves it, as well to spare the remaining bees the trouble of raising a sovereign artificially, (which is further injurious to the prosperity of the hive, owing to the time that must elapse before any brood can be perfected in it,) as to prevent the liability of accident arising from the possible absence of eggs or suitable brood wherewith to raise such a queen.

Let us then suppose that the amateur bee-keeper has formed the conclusion that one of his stocks is in a sufficiently forward state to be operated upon—from the appearance of drones, the abundance of population, &c., and also that a favourable opportunity presents in the state of the weather, which ought absolutely to be perfectly calm,—the golden hour is arrived; let him sally forth to his apiary. The cloudier the day the better; if the sun shines, however, let the operation be conducted in the shade of some friendly wall or overhanging tree.

There ought generally to be two persons assisting in the operation, both well armed with bee-dress and gloves; for this is sometimes a business of no little peril, although in most cases I have found the bees remarkably quiet. The instinct of loyalty, or the passion of fear, seems

at such times to neutralize all other passions and instincts. Every article requisite for the operation of driving having also been provided, (see page 57, where this is fully- treated of[1],) and lying by ready for use, let the business be opened (say at about 10 o'clock A.M.) by the chief operator seizing hold of the full hive, which must be very carefully and gently adjusted bottom-upwards in a pail, while the assistant replaces it instantly with an empty hive, to amuse the bees as they come back from the fields, and those also which may chance to escape during the process which follows. A second empty hive is now placed over the full one reversed, the cloth thrown over both, and tied securely round; after which, drumming with sticks is resorted to until the bees have hummed themselves up into their temporary attic; in short, the same treatment is adopted as in the process of autumnal driving already described. The greatest care, however, must be taken throughout to avoid the slightest jar or concussion of the full hive, both in moving it and drumming it afterwards, so as in no way to endanger the breaking of the combs inside. These being mostly heavy with brood, the heat of the hive, too, being very great, (often above 100° Fahrenheit,) any violent handling would be sure to

[1] Instead of the sulphured feathers, however, should be substituted a stout piece of list, about three yards long.

dislodge some of them[1]. When it becomes evident, by the loud humming within, that the bees have begun to climb, in which case the queen is almost sure to be with them, let the upper hive be taken off. Ten minutes, or even less, will generally suffice for the operation at this time; because it is desirable to leave a considerable quantity of bees behind in the old hive to hatch out the remaining brood. When taken off, the hive into which the bees have ascended, if it is the intended permanent dwelling of the bees, must be placed on a bottom-board, and set as near as may be to the old stand, on a stool or table—not on the stand itself, to avoid crushing any of the thronging bees about it. In a few minutes, if the queen be in it, all the outlying insects—those, I mean, which have returned from the fields, and have hitherto been busied in searching for their home and their queen,—will have joyously entered it. Towards evening it may be put on the stand from which the old hive was taken. Should it be desired to settle the bees in another hive than that in which they were driven, (and I advise the use of the smaller double-hive for autumn spoliation, see Chapter IV.,) all that is required, is to knock them out *en masse* upon the ground in front of the hive, which ought before to have

[1] See Appendix, Note F.

been set (likewise on the ground) on its own board, one side of it also being slightly elevated on wedges. When the major part of the swarm have crept up into it, let it be gently removed to a position near to the old stand, and treated as in the other case.

While one person is thus employed, let the other, immediately on seeing the upper hive taken off, turn the old hive upon a bottom-board, and (should he perceive neither too many nor too few bees in it) carry it to a distant and shady part of the garden, or to its intended stand, where, however, it must be kept as cool as possible. Without loss of time, in order to prevent the escape of too many bees, let him tie it up with the list bandage, previously thrusting a few pieces of slate under the edge of the hive, to allow for the admission of air. In this state it must remain till the third morning, early, when the list bandage may be unfastened. An immediate rush of bees will take place, some of whom will find their way back to their old locality, now occupied by the new swarm; nor is it to be considered a misfortune that they should do so, as they will beneficially strengthen it. The most part, however, will certainly return back again to the old hive on the new stand, which will in a few days seem as populous as ever, owing to the rapid development of brood.

Should it have been found, however, on re-

moving the upper hive, that only a *few* have ascended into it, then must it be first ascertained if the queen is among them. This will quickly appear by knocking them out in front of their intended dwelling; for while they will march readily up into it if she is with them, they will, on the other hand, missing her, soon be in a fever of anxiety and restlessness. In the former case, set the new hive on the old stand at once, while the old hive is removed, but to a greater distance, and treated as before, only, instead of tying it up, the bees must be suffered to escape from it *until* the new swarm is strengthened sufficiently, after which it may be tied up till the third morning. Should it appear, however, that the queen is *not* among them, take two of the combs from the old hive, which seem fullest of eggs and *young* brood: next arrange these in the new hive, leaning one against another, or against the side, but in such a manner that, on the introduction of the bees, these combs shall not possibly fall down flat. The best way to do this, is to remove the top from the hive, (which must be set first on its board,) replacing it after the combs have been well disposed inside. Now carry the hive, board and all, to the old stand, and either slide it on to the pedestal, to avoid crushing any of the bees, which will be sure to throng it, or else put it on a stool close by. In a few minutes

the agitated bees will scent it out, and speedily take possession. The old hive, in this case, must not be closed at all, in order to facilitate as much as possible the escape of the bees, many of whom will fly off straight to the old place, now occupied by the new swarm. These will proceed forthwith to rear a queen artificially. It might be an advantage, perhaps, to tie up the old hive, unfastening the bandage every now and then, for a few minutes at a time. In this case, many bees would escape, and not being able to return, would naturally stay with the new swarm, if not previously disposed to do so.

Or if this plan be thought too difficult and hazardous, the old hive must be replaced upon its stand till another opportunity occurs. In either case the emergency which will require this treatment is a rare one, as in nineteen instances in twenty the bees will readily follow their queen, who on her side will as readily ascend.

Again, should *too many* ascend on the first driving, (and, if possible, two or three thousand bees should be left to feed the young brood, and attend generally to the business of the hive,) let the old stock be replaced on its wonted stand for a few minutes, until a sufficient number of bees shall have entered into it. It may then be tied up as it stands on the board, and board and all be removed to the place intended for it; the new swarm on a fresh board may then be substi-

tuted for it in the manner already pointed out. This treatment will be found most efficacious in dividing the population of the old stock in its due proportions.

Let us suppose, however, that every thing succeeded well according to the method first detailed, What, it may be asked, is the several condition of the two hives? In the *new* hive on the old stand is, or ought to be, a powerful swarm of more than ordinary size, which, being formed in the prime of the year, will work with astonishing vigour, and increase rapidly in weight. This is what I have before termed the *spoliation* swarm, whose entire plunder will take place about the first week in August, if put into a small hive, and not intended for preservation. Shortly after its establishment, *i. e.* some time in the course of the next week, it must be surmounted by another hive or super of about the same dimensions in ordinary seasons. In the *old* stock is no queen at present; but, doubtless, royal nymphs or larvæ of various ages, one or other of which will succeed to the vacant sovereignty of the hive in a few days if the swarm were forced at the proper time. When the bandage is unfastened on the third morning, the bees by that time will long have ceased to forget their old queen, their whole attention being now given to the wants of the rising brood of royalty on which their hopes depend. If there chanced to be no

royal brood, (as it is always desirable there should be,) they will already have set about rearing a queen artificially. Could the interior of the hive be seen at this time, the rudiments of three or more royal cells would be distinguished rising out of the centre of the combs in different parts of the hive. I presume that in the present day there are no sceptics to be found as to this singular fact in the history of the bee—their power, I mean, to transform a worker egg or worm into a queen. Should any such be a reader of these pages, I can give him distinct assurance, that no less than three several instances of the rearing of artificial queens came under my notice last summer, and there are many witnesses to the fact.

We will now follow the after treatment of these stocks. The new swarm (if intended for autumn plunder) must be shortly enlarged by additional hive-room, and treated in general exactly in the manner already pointed out in a former chapter for the management of yearling or spoliation-swarms[1].

With respect to the old hive, out of which the old queen was driven, together with the prime-swarm, I differ from Dr. Scudamore as to the best method in which it should be dealt with. His instructions on this point are not

[1] See Appendix, Note G.

very clear; at least he gives us to suppose, that at the end of fourteen or sixteen days the hive will be ready for forcing the second swarm, all the brood, with the exception, perhaps, of a few drones, having been hatched out. Now, if the old queen was laying up to the very eve of her departure from the hive, there will still be left unhatched all the brood from the eggs that were laid during the five or seven last days previous to her expulsion, whether drone or worker[1]—*i.e.* from 1000 to 5000 bees, according to the size of the hive and the state of the season—a number in either case too considerable to be lost. Moreover, if the young queen had to be reared *artificially*, she would probably not have issued from her cell by this time; and at least *twenty* days ought, I think, to be allowed for her to gain the necessary strength before her expulsion in turn. On the other hand, if (as is much to be desired) the young queen were ready to leave her cell shortly after the removal of the old mother, there is every probability of a still greater breadth of comb being occupied with eggs laid by her, which the bee-master will be equally loath to destroy. For these reasons, and for others far more weighty, (see what I have said on this point in Chapter V.,) I do not advise the

[1] And there are always more worker than drone eggs. It is a fallacy to suppose that the queen lays drone eggs exclusively (or even principally) at any period of the year.

forcing or suffering the issue of *any second swarm at all*. Instead thereof I would recommend that the old hive, having a young queen, be kept as it is for winter stock. In this case it will be treated in a precisely similar manner to that described for the management of his old hives by the cottager, see Chapter V. Should a cast issue *naturally*, for instance, (which is not very likely,) it should be returned at once, after excision of all the surviving royal cells that can be got at. Dr. Scudamore gives an additional reason for his recommendation of artificial-cast forcing, viz., that the plunder of the old hive at this time would put the bee-master in possession of an early harvest at the best season of the year. But the quantity of honey gained will be but a poor compensation for the expenditure of honey by the bees in the construction of fresh comb in a new hive, which might otherwise be stored away in large abundance against the approach of winter in the old one, thus forming a good and useful stock for another year, while the honey itself, being stored in old comb, would be but of little comparative value to the bee-master. If the consumption of honey in the elaboration of wax is any thing so considerable as I make it out to be[1], it certainly is a most suicidal policy to break up a hive whose comb is still good for

[1] See Appendix, Note H.

breeding purposes, for the sake of five or six, or even ten pounds of inferior honey! I advise, therefore, that, after the early swarm has been forced out, which may be encouraged to its greatest possible strength by suffering nine-tenths of the bees to leave the old hive with it, this latter be suffered to stand over to another year as a winter stock. A prime-swarm so formed ought to yield an autumn spoil, in an average good year, of from 30 lbs. to 60 lbs. of virgin honey; and if its weight, on issuing from the hive, exceeded six pounds, which it not seldom will do, it may often greatly exceed the largest of these figures, while the old stock may be expected to weigh from 25 lbs. to 30 lbs. *net contents* the Michaelmas following, at which time a comb or two (*i.e.* the *lower part* of those combs) may be cut away with advantage, to facilitate the renovation of the hive. As to the renewal of comb, it might be effected in a different and, perhaps, still better way. Suppose at the end of three weeks, after the first swarm's issue, (or earlier, as the case may be,) the bees are driven out for a few minutes, part of the combs (which will now for the most part, if not altogether, be empty of brood) may be removed at once thus early in the season; this would probably have the effect of stimulating the bees in it to renewed

activity, so that there would be no gap[1] among the combs through the winter, as might be the case otherwise, while probably the weight of honey would not be much less than in the former instance. I have observed that the existence of unfilled space in their hive not a little warms up the bees' energy, whether it be in spring, summer, or autumn.

To return to the apiary, it is evident that in a good season the bee-master may not only obtain a famous harvest from the autumn plunder of his spoliation-swarms (especially if they were formed at the right time, and were strong in population); but he may also get from them several small hives or glasses full of the purest honeycomb in addition. Even the old stocks will sometimes, though less rarely, afford a handsome glass to grace his breakfast-table, besides laying up for themselves an abundant winter store. Here then will be seen the advantage of the hole at the top of my Golding's hive, over which some additional store-room can be placed, (with or without the use of an adapter,) by which means the removal of the crown-piece of wood or straw is rendered unnecessary. The room supplied must, however, be

[1] And yet I am disposed to believe that a vacuum of air in the hive has a tendency to keep bees in good health through the winter; *and it certainly promotes early activity.*

determined by circumstances of locality, season, and strength of population. As to the time when such room additional should be given, I refer the reader for instruction to Chapter V. of this book. In the same chapter, also, will be found full directions for the management of his hives in autumn and winter. In no material respect will the proceedings of the cottager and amateur be different in these particulars.

Where the system of management advocated in these pages is pursued, and the prime-swarms of the season, when plundered, are reunited to the stocks from which they severally issued, the value of the advice given in Chapter II., with respect to the arrangement of hives, will be very apparent at the season of the autumnal harvest. I repeat here, therefore, that both stock and swarm should stand as near together as possible —say about one foot and a half distant from each other, but distant from all other stocks at least three and a half or four feet. But for an arrangement of this kind the apiary would be in an uproar every autumn from the invasion of their neighbour's hives, by the inmates of the plundered swarms; whereas they will now readily and peaceably unite with their parent stocks, for which they will not have far to search. It were an improvement, perhaps, instead of having a separate stand for each stock, to use what Mr. Taylor calls a *hive-range*, (see Bee-Keeper's

Manual, page 32, 4th edition,) from two and a half to three feet long, to accommodate each couplet of hives. Thus, after effecting the union, (the two hives, parent and swarm, having stood side by side on this range all the summer,) the old hive might be slid a little to the right or left, so as to occupy the middle of the range halfway between the position previously occupied by the hives. It would, in this case, be requisite to move the stock back in winter to the extremity of the range, so that the swarm of the following spring might stand at the proper distance from it.

Should much brood be found on examining the prime-swarms when they come to be taken up, by all means let it be carefully preserved, for it must be borne in mind, that it is *this very brood* (and not so much the bees actually driven from it, especially if the driving take place *early* in the autumn) *that will live out the winter, and assist most in advancing the prosperity of the hive to which it is added the following spring.* To preserve it, therefore, let the following instructions be closely attended to, which are somewhat different to those recommended to the cottager. When most of the bees have been driven from the hive, and united to the parent stock, let the top be removed, and each bar of the hive lifted out, *having previously passed a knife under it, so as to sever the comb below from its attachments to it.*

All the bars being lifted out, proceed to cut out of the hive as much of every comb as contains honey, taking care not to cut quite down to the part which contains the brood; indeed, it is well to cut out no more comb than is actually *honey-full*. This being done, (and the quicker the better, that the brood-comb may not grow cold,) let the hive be set over the stock to which the bees out of it have already been joined. They will quickly cluster over the remaining comb, carry below what little honey they may find in it, and *hatch out the brood*. In this way the winter stock will be most beneficially strengthened with large promise for the future. Three weeks later, (or in less time if the brood were not very young,) the upper hive may be removed, and the stock below set in order for the winter season. If not more than three or four inches deep of honeycomb have been cut away from the upper part of the hive beneath the bars, the now empty combs (if still fresh and good, *i. e.* not more than two or three years old) may be preserved with advantage; they will prove a most valuable boon to a prime-swarm of the following spring, and will most materially, not merely assist its own profitable advancement, but also *increase the next year's honey-harvest of the bee-owner*. The hive must, of course, be carefully stowed away, and covered up in a dry place, to keep it fresh and sweet, and safe from the inva-

sion of the prying and destructive wax-moth. Should more than four inches deep of comb have been cut away, what remains had better, perhaps, be removed altogether and melted down, because the bees, to whom it might chance to be given the next year, would very likely not elevate their new works sufficiently (for in this case they work *upwards*) to touch the bars, and there secure them, before the weight of the new structure (honey-laden) causes it to incline out of the perpendicular, and, perhaps, to fall altogether; all danger of this would, however, be avoided, if some portion of comb were left attached to the bars, or subsequently applied to them; for in this case the bees would build downwards as well as upwards, and so meet the rising works half-way. It cannot be too carefully borne in mind, in all hive manipulations, that wax is a *most expensive* article in the economy of bee-architecture, though its value is but trifling in the market; every saving of it, therefore, is important. The most useful combs, undoubtedly, are the centre ones; and these will generally be found more empty than the others, at least, in the middle part.

In conclusion, I cannot do better than introduce an extract from Dr. Scudamore's work, by way of showing how many and great are the advantages to be derived from a systematic adoption of the artificial system, though I doubt

not many of my readers will have discovered not a few already.

"There is no certainty," he writes, "of the time when this (the expected rising of *natural* swarms) will take place, by reason of several causes, some of which may prevent it altogether; and the inconveniences to which the proprietors are liable, who do not form artificial swarms, are consequently many. *First*, they are obliged to watch the departure of swarms very assiduously for six weeks, and sometimes much longer: whatever attentions may be made by persons entrusted with this care, many swarms fly away, which it is impossible to arrest. It has been calculated by a great bee-keeper, that a fourth part of the best swarms are usually lost in this manner. *Secondly*, he who has a small number of hives is obliged to watch them with the same assiduity as if he had more; and he who has a greater number is often much embarrassed, because it is no unusual thing to see several swarms go off at the same instant; some escape on one side, and some on another, or unite themselves together. *Thirdly*, a cold and rainy time, which may happen at the moment when swarms are disposed to come forth, often prevents the bees from swarming. And further, swarms may issue at times when one wishes to be otherwise engaged; and, on the other hand, although the proprietor

may be present, his swarms may choose to settle in places where it is difficult to hive them. Now it is easy to imagine, and still worse to experience, some of these difficulties were it always so, (that swarms issued regularly, and settled suitably, and in good time,) all would be well, and it would be unnecessary to interfere, or in anywise to anticipate, the gratifying spectacle of a natural swarm. But the vicissitudes of our climate are so frequent, ever varying, and ever changing still; so sudden, and sometimes so extraordinary; smiling now, and now frowning again, aye, as coquettish and uncertain as the youthful maiden; that the bee-master, in trusting to the processes of nature, more frequently finds his best wishes annihilated, and the golden hours of spring dwindled and frittered away, ere his swarms have come forth; and a few weeks of summer remaining, barely suffice for the gathering of honey, ere the cold nights of autumn, and the approaches of winter, close in the scene."

CHAPTER VIII.

OF BOXES, ETC., SUITABLE FOR AN IN-DOOR APIARY.

THERE can be no doubt whatever that hives of wood are preferable to hives of straw for many reasons, where so situated as to be sheltered from the effects of both heat and cold; hence their universal adoption by the best and most successful amateur apiarians.

"The best wood for them," says Dr. Bevan, "is red cedar, the fragrance of which is regarded by some as agreeable to the bees; but the chief grounds of preference are its lightness and sponginess, (whence it is a bad conductor of heat,) and its effect in keeping moths out of the boxes. Whatever kind of wood be made use of, it should be well seasoned; yellow deal answers the purpose very well." In making the boxes, Mr. Taylor judiciously advises that they be "well put together, observing that the grain of the wood always runs in the horizontal direction, when its tendency to expansion or contraction is rendered of no importance." The size which he recommends, I think, however, too small for the *stock or breeding-hive*. Instead of "eleven inches square," I would recommend

twelve or thirteen, and from eight to nine inches high, inside measure; the thickness of the wood throughout being "not less than an inch, or, if exposed, a little thicker."

In my own apiary I prefer the *collateral* system, or, I should rather say, I adopt a combination of both the collateral and storifying methods; for while I use *two* boxes collaterally, it is my practice to place several large glasses at a time each over its hole on the top of the stock-box; as I have always found that bees work more readily over their breeding-hive than at its side; at the same time, to afford them abundance of room, without giving them the labour of ascending to a second or third story, I use one side-box to each colony.

It will be found in general that two such boxes afford ample accommodation for the largest population that can be reared on the depriving system, if, together with their use, room additional be supplied as fast as the bees require it, by giving them three or four bee-glasses, from six to eight inches in diameter, (or several smaller ones,) at a time. To furnish space for the glasses, which must communicate every one with the *stock-box*, each by its peculiar hole, (for the bees are usually very much indisposed to work over a side-box, though I have known them do so,) it will be found advantageous to use an adapter of thin mahogany or

cedar—woods that are least given to warp—(if deal is used, it should be framed,) from fourteen to sixteen inches in diameter. There must be pierced in it four holes, each two inches in diameter, exactly corresponding with four holes (more or less) in the top of the box over which it is placed. Two or three long screws will keep it firmly in its position, only let them be well greased, to facilitate their removal. This adapter (which, by the way, must not project over the *side-box*) is only for temporary use in summer, in the working months; after July, therefore, if done with, it may be removed. By this means, room for the storing of between 25 lbs. and 35 lbs. or more of honey may be supplied at the top, not to speak of the side-box, which may hold at least 60 lbs. more; and the season must be good indeed, and the bees amazingly numerous, to require more hive room than this.

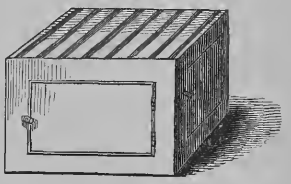
Each of my boxes, which are made of exactly the same dimensions, so as to be shifted, if need be, from one colony to another, (this is, however, of more importance in the case of straw hives than of boxes,) has three windows,—and I see no reason why it should not have four,—made as large as possible consistently with a due regard to the strength of the box. A door, fixed on hinges, closes neatly over the glass in each window, and it effectually excludes the

light, as the glass is fitted in a rabbet with putty. The rabbet should be as shallow as possible, that the inside of the hive may be perfectly plain, for facility of cutting out the combs.

Dr. Bevan recommends the application of *bars* to each box: these will not, however, be of any great advantage in the working of the hives according to my plan, while they cannot fail to increase the expense of their construction very considerably. Still, if it be thought desirable, (and they will often be found useful,) they may be added. They are generally made to run parallel with the sides of the box; those, however, who like, as I do, to see as much as possible of the economy of the hive at as many points as possible, I would advise to make them run diagonally from corner to corner. Not only is this a great advantage to the bees, chiefly in winter and the early spring, when the heat can be more readily concentrated in one of the corners of the hive, but, by this arrangement, the breeding of the queen may be seen going on in every part of the hive at once, as a considerable portion of *every* comb will come into view at these windows. Not using bars, I invariably make a piece of comb adhere to the roof of the boxes having this direction.

As to the arrangement of the bars, I cannot do better than transcribe Dr. Bevan's directions for fixing them, as well as adjusting the top-

board on them. "The sides of the boxes should be an inch thick, and have the upper edges of the fronts and backs rabbeted out half their thickness, and half an inch deep, to receive a set of loose bars upon their tops, which should be half an inch thick, and one inch and an eighth wide." The number of the bars will be regulated by the size of the box. "If the distances of the bars from each other be nicely adjusted, there will be interspaces between them of about half an inch. The precise width of the bars should be particularly attended to, and also their distances from each other, as any deviation in this respect would throw the combs wrong, particularly if that deviation gave an excess of room. It would be better, therefore, for them to be somewhat within the rule, than to exceed it by ever so little, for whenever the bees evince a disposition to depart from the prescribed dimensions, its tendency is generally to make the combs approximate."



"Each box (on my plan) must have one close cover, which should be an inch thick, and well clamped at each end to prevent warping, as a considerable quantity of steam arises from the

bees at certain seasons. The top, being intended to take off and on, should be secured by means of four screws, each placed about an inch and a half from the respective corners." Of course, where the bars are dispensed with as unnecessary, no rabbeting will be wanted, but the top must be screwed down at once, thus effecting a considerable saving of expense.

In one *corner* of each of my boxes I always place a small thermometer, so fixed, with its face to the glass, that I can see enough of it for my purpose, while it encroaches as little as possible on the surface of the glass itself. In adjusting it, care must be taken that no space occurs between the thermometer and the glass for the bees to pass, otherwise they would quickly render it useless, by smearing it over with propolis. Its use is very great, chiefly in summer, as an index when to give additional room, which should always be supplied, and ventilation afforded, if possible, when the internal heat raises the quicksilver to 90°. It has other advantages, also, which will quickly manifest themselves to the scientific apiarian. To enable the thermometer, in such a position, to tell at all correctly, the bees must be compelled to work in a direction towards it, (not transversely across,) otherwise there may be a difference of 10° or 15° at times between the temperature of that corner and the centre of

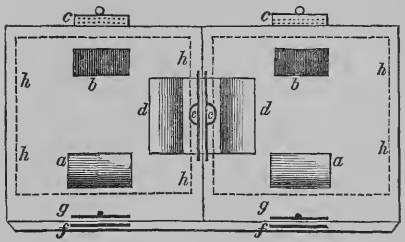
the hive. A bit of worker comb, by way of a guide, affixed to two or more of the bars, (or to the roof itself, if there be no bars,) will, as I said before, suffice to give all the combs the proper direction.

As to the matter of *bottom-boards*, I suggest to the curious and scientific apiarian the following arrangement of them, by which he will at once perceive how great the command of his bees which it will give to him. I fear the directions for their construction will appear to involve a somewhat complicated business,—and some nicety in fitting the parts together is certainly required,—but a clever superintendent and an adroit workman will soon prepare them satisfactorily [1].

Each colony of two boxes then should have its own *pair* of bottom-boards, which will afford facilities for weighing the hives at any time, summer or winter, as well as for inspecting the condition of the interior during the breeding season, at any hour of the night or day. These boards (of which there is one to each box) should be made of two pieces of well-seasoned wood, each piece being five-eighths of an inch thick, glued and nailed together, the grain of

[1] It will be evident that a slight modification will simplify the process greatly; as, for instance, throwing the two boards into one, and making it a *fixture*, as well as by the omission of all the slides and their grooves.

the wood in one piece running at right angles to the grain of the other, as a precaution against warping. To strengthen them still further, they might be clamped together with bands of iron at the corners, or framed, if preferred. Every such board, when the two pieces are put together, will be one inch and a quarter in thickness. Before putting together the several parts of each board, a tunnel must previously be made in their midst, from *f* (the external opening, as seen in the accompanying diagram) to *a*, where



it communicates with the interior of the box, which is supposed to rest on the dotted lines *h h*. This tunnel, which had better be grooved chiefly out of the bottom piece, at least at *f*, and which slopes upwards a little towards *a*, must be four inches *wide*, three inches and a half *long*, (that is, from *f* to *a*,) and not less than three-eighths of an inch in *depth*. Each of these boards should be three inches wider

than the boxes on the *wall-side* and on the *sides between the boxes;* on the other sides they need not project more than half an inch beyond them. The excess of space on the two sides affords room for the insertion of the hand between the boxes themselves, and between the stock-box and the wall, (on the entrance side,) to regulate a set of zinc slides—perforated or otherwise—which close the communications between box and box, and box and external air, as at *g* and *e*. There are *two* slides which command the entrance-way, one fixed in the board itself, the other in the wall, over against the mouth of the tunnel at *f*; and two slides, in a similar manner, at *e*, one at the edge of each board, which slip into a groove, and prevent the bees from passing from one box to the other. It is evident that the grooves in which the slides enter must be in every case made at *the very edge* of the boards, otherwise, in withdrawing a box for any purpose, some bees, that might be passing at the time, would be intercepted between the slides, to the annoyance of the apiator. To prevent this, it will be found useful to cut out a thin piece of wood at the edge of the board, and to fit over it, in each case, a thin piece of stout and inflexible metal—zinc, copper, or iron—having a hole in it, corresponding exactly to the size of the passages. In this way the slides will fit close together, the pieces of metal alone interposing

between them. A piece of wood (having a suitable hole in it; see page 123) nailed against the wall to which the slide is adapted will meet the difficulty on that side.

There must also be constructed a tunnel as at *d d*, for the bees to pass from one box to the other. It will be sufficient to cut it out of the upper piece only of the double board; and it should be rather deeper and wider than the entrance-way. A plate of iron or thin mahogany should also be fitted over it in each board, as at *e e*, thus forming a covered way beneath it.

The holes *b b* are cut quite through the double board in each box, and serve the purpose of *ventilators*, which will be found of very great use at certain seasons. They are closed by a pair of zinc slides, *c c*, the one perforated, the other plain, which passes in a groove, either between the doubled boards or beneath them. There must *always* be one of these ventilators to each board.

Three or four small screws, with rings attached, must be affixed to the upper side of each board, into which the strings will be passed, which are necessary to facilitate the removal of the boxes for weighing, inspection, &c.

CHAPTER IX.

OF THE BEE-HOUSE AND WINDOW APIARY.

Bee-hives ranged in order in a well-sheltered garden form so pleasing an object to every true lover of rural pursuits, that it cannot be wondered at how tenaciously most apiarians adhere to the management of their bees in this way. I am the last person to quarrel with this predilection, in which I myself fully share. While, however, it must be confessed, that to bee-hives located in the open air, in point of picturesque appearance and rural interest, the palm of superiority is to be accorded; it cannot be denied, that for scientific purposes, general facility of management and profit, out-door apiaries must yield to such as are conducted in-doors. The advantages of protection from the weather, of security against accident, of opportunities for minute and leisurely observation, cannot be too highly estimated. I think, therefore, I am fully justified in reserving to this place, as a sort of climax to my subject, the details and treatment of *house-apiaries*.

The use of some sort of cover for bee-hives

has been common among all bee-keepers of every country. Our old apiarians, who aimed at any improvement upon the prevailing system, generally made use of a sort of shed or box capable of holding from one to six or more colonies of bees; and such are still to be seen in some places. Speaking of boxes of this kind, Mr. Taylor very justly observes, "the common bee-houses, as usually constructed, open in front and closed against approach behind, retaining the sun's heat as in an oven, are very objectionable. These are frequently unsightly, the receptacles of dirt and insects, and in most instances inconvenient to operate in." As these boxes, moreover, very imperfectly answer, at best, the end in view, I shall content myself with this passing allusion to them, leaving it to the ingenuity of the apiator, or to the instructions of the older bee-authors to guide him in his choice and direct him in the making of such sheds.

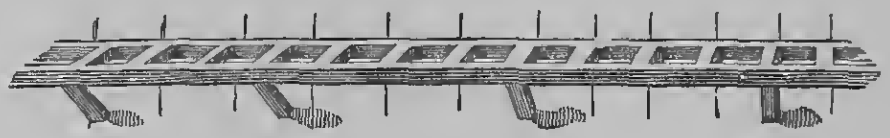
There can be no doubt that a substantial bee-house, large enough to shelter the bee-master as well as his bees, where the outlay of a few pounds can be afforded at the outset, is the best of all places for locating hives, (be they of wood or straw,) and conducting the requisite operations in bee-management. Dr. Bevan, in his "Honey-Bee," has described his own apiary, which appears to have been a very simple, useful,

and inexpensive structure. It answered the double purpose of bee-house and potato-shed—the potatoes below, the bees above. His house, which was "seven feet square in the clear, afforded room for seven colonies—three in front, and two at each end." Being an advocate of the *storifying* system, which he has worked with very great success, his colonies, or "piles of boxes, were placed within the building, at somewhat less than two feet apart, so as to make the external entrances to each pile respectively about a yard asunder." Preferring, as I do, a combination of the storifying and collateral system to the exclusive adoption of either, (as explained in the last chapter,) the same size of bee-house, with a slight additional elevation of roof, might be made to accommodate nearly double the number of colonies, there being two tiers of boxes one above the other. In this case, the distance between each colony of two boxes would be about one foot, ample space being thus allowed for handling the boxes and inspecting the interior by the side windows. Dr. Bevan's house was "built of timber, lathed and plastered both within and without;" and was "not only thatched thick on the top, but down the end and sides." On that side, however, on which the bees entered, the thatch, of course, terminated at some distance above the entrances.

A very picturesque bee-house (similar to one which I saw two years ago erected by a farmer, and which worked very successfully) might be constructed of a pentagonal or hexagonal shape, two or three of its sides, as the case may be, being occupied with a double row of bee-boxes. The tiers of boxes, whatever be the size of the house, should be elevated severally at the height of three, and five-and-a-half, or six feet; and there ought to be a space between each tier of one-and-a-half or two feet. In this case, the roof, which should be *well thatched*, must not be lower than nine feet, to afford ample room for working the bee-glasses or *supers* over the higher tier of boxes. Such a house would be best made of brick, with stout posts of wood at the angles, up to the first row of boxes, from that upwards of wood, lathed and plastered both within and without. The other three sides of the house would be taken up, the centre one with the door, the others each with a window, in which, were it thought proper, an observatory or leaf hive might be fixed. These windows and their shutters should be so contrived, that the house may be darkened at pleasure, room being made for the admission of light by one aperture in either of the windows, through which the bees may escape (as they naturally fly towards the light) whenever a colony is to be deprived of a glass or box.

The roof, also, of the building should project two feet or more on all sides but the north, to keep off as much summer sun as possible from striking on the bee-house front or sides.

Instead of the shelves or *whole* board upon which the boxes in such houses usually rest, I prefer a kind of frame with cross-bars, supported by brackets, as seen in the accompanying dia-



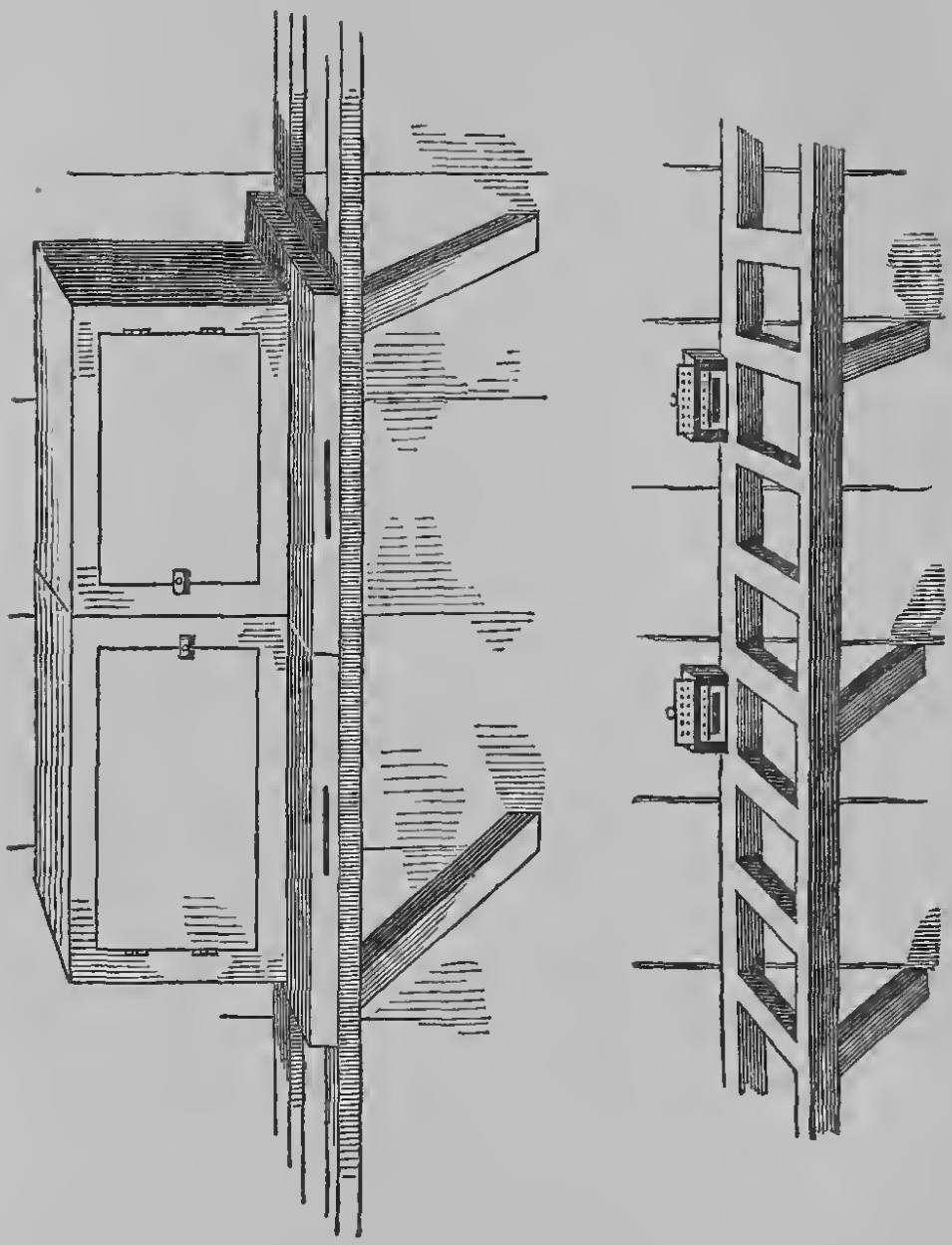
gram. The cross-bars should be so arranged that the edges of each hive-board shall rest upon a bar, to which it may be fastened by hooks and eyes, or else by the insertion of some long screws through the board into the bar, to keep it always firmly in its place; otherwise there should be some similar contrivance for attaching these boards so securely to the wall, that the entrance-holes in both board and wall shall always exactly coincide, without the possibility of the bees escaping between them into the bee-house. Of course these fastenings must be easily removable at pleasure, *i.e.* whenever any operation is to be performed with the boxes. The chief advantage of this open frame is the facility it affords for ventilation; otherwise a hole must be cut in the shelf, if made of a whole

board, to correspond with the hole for ventilation in the board of the hive itself; or these boards must each be elevated on bars of wood nailed down upon the shelf.

A bee-house of this description will have many advantages; here the boxes and the bees will be kept cool in summer, be the sun's rays ever so burning, as well as snug and warm in winter: here there is all safety against the attack of robbers, the intrusion of vermin, the plague of damp; while no gusts or hurricanes of wind need trouble the apiarian, who, besides, has every opportunity for the most careful and undisturbed observation. I have seen several such bee-houses; among them is one belonging to the Lady of the Manor in my own neighbourhood, from which, owing to her immediate superintendence, and the able assistance of an intelligent gardener, she has harvested very large stores[1] of the purest nectar. A bee-house of this kind, if a separate structure, should stand in a garden of its own, low, if possible, yet dry, and surrounded every way by a rampart of trees.

A last kind of apiary, inferior to none other in any of the advantages which I have enume-

[1] I have heard her boast of a harvest of three cwt. of honey in one year (this was in 1847) from seven colonies!!



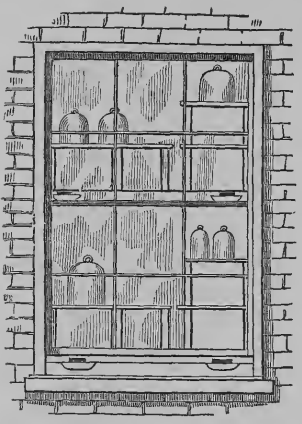
rated, is what may be called the *house-window-apiary*. It is in this way that I have chiefly managed my own bees of late years. Living on the outskirts of a country town, with no suitable place externally in which to locate my bees, necessity has led me to make use of some spare windows in my cottage which are well adapted to this purpose. Any window facing any quarter of the heavens, and at any height, will answer the purpose almost equally well, provided only the situation be *well sheltered from high winds*, or the destructive influence of *sudden gusts*, or *strong currents of air*. My own apiary labours under great disadvantages in many of these respects; not only so, it stands within 100 yards of a broad and rapid river, with an aspect, wholly unprotected, looking to the south-west, whence the winds blow strongest and most frequently of any. In spite of these drawbacks, there is not to be found a more thriving or profitable apiary in all the country round. I am obliged to be often on the look out, however, and have frequently to confine my bees entirely for days together in rough and stormy weather. If the slides be shut down in the early morning, before the bees stir, taking care at the same time to *open the ventilators* by day, and the slides themselves by night, the bee-master may keep them shut up in most weathers (without much annoying his bees) for

forty-eight hours together. My plan is, in doubtful weather, to confine them till the day declares itself; if the wind be not too high, I wait a sunshiny moment, and set them free. Of course this treatment is pursued with most advantage in the early spring: as the population increases, it becomes more difficult and hazardous, neither is the precaution so necessary.

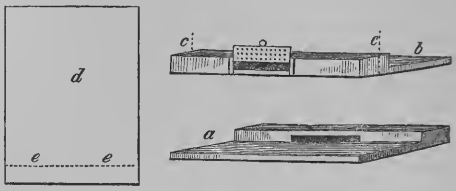
In favour of placing bees in such a locality, it may be observed that these insects are naturally fond of, indeed they seem to give a *preference* to, high situations, above all other habitats. In their wild state they will fix upon some tall and gigantic tree for their dwelling, and, even after domestication, will not seldom prefer the roof of some house to any other locality. Several instances are on record of bees having collected immense stores of honey in such places, doubtless owing to the shelter afforded from the extremes of cold and heat, (and the boxes must be well protected from the sun,) and the generally good ventilation and dry atmosphere of places of this kind.

This sort of apiary has the additional recommendation of *economy*,—indeed, from the very trifling outlay required, it may be considered the cheapest of all methods of locating beehives, whilst there is every facility for the most leisurely and uninterrupted observation in all weathers. Nothing more is requisite than to

fix a frame (similar to that already described) or a board, *against* a window that has no inner ledge, or *in* one that has, upon which the hive-boards may rest. A hole must also be cut in the lower frame of the window-sash, (to which an alighting-board is affixed on the outside,) corresponding in size with the mouth of the bee-passage tunnelled out of the bottom-board, which is thrust up as close as possible against it, so that the holes may exactly coincide. Where the window is sufficiently large, as in the above sketch, two colonies may be placed side by side, one on the collateral, the other on the storifying system. In this case the hive-entrances must be as far distant as possible the one from the other, that the bees may in nowise be tempted to quarrel. If only the lower part of the window be occupied by bees, the upper sash may be left free to



ventilate the room; but if there are other windows suitable for this purpose, and it be thought desirable to place another colony, or set of colonies, in the same window, nothing is easier than to adapt a frame or shelf higher up, with a block of wood nailed or screwed firmly to its upper-side, answering the purpose of alighting-board and external entrance-way. A little putty will make all right and tight against rain and wind. It is hoped the accompanying diagrams



will sufficiently explain the manner in which this block will be arranged. For instance: *a* is the block itself, with alighting-board attached, as seen from the outside; *b* the same block, as it appears from within, to the back of which the zinc slide (as described at page 115) is attached, which commands the block passage. The square figure *d* represents a pane of glass, of which the part below the dotted line, *e e*, has been punched out, it having been previously cut with a diamond. Through the narrow opening thus made,

the block *a* or *b*, which rests on the lower edge of the window-frame, is passed, it having previously been securely attached to the upper-side of the shelf or frame fixed in the window, upon which the boxes rest[1]. Of course the bottom-board runs closely up to the block, and is secured in the same manner as the boards of the lower tier of colonies. It is well, where the aspect of the window faces the sun, to hang up in it a piece of thick drugget, which, more than any thing else, will tend to keep the boxes cool. The same will also exclude the frost in winter.

[1] The dotted lines at *c c* show the place where the block rests on the window-frame. The thicker and back part of the block is that which is screwed down to the shelf or frame.

CHAPTER X.

OF THE MANAGEMENT OF THE BEE-HOUSE OR WINDOW APIARY.

ALTHOUGH the apiarian, who manages his bees according to the method unfolded in this chapter, will generally be able to do without any cottage hives in the open air, it will be found desirable to have one or more such kept for swarming purposes; among other reasons, to supply any failure which may chance to occur in his box colonies, whether by the death of a queen or other accident. Under the old (if it may not be called the *present*) system, accidents of this sort were common enough; for the depriving system, as practised by the generality of amateur bee-keepers, is not by any means so universally successful as its advocates would have us believe it to be: for two or three years, indeed, after the establishment of a bee-house, or of any individual colony in it, matters may go on well enough; but if all swarming be prevented, it becomes a mere chance whether it shall succeed or fail afterwards. If the queen dies at the right time, *i. e.* in May, June, or July, and her decay be somewhat sudden, the colony flourishes, because a

new queen, raised artificially or otherwise, takes her place, and four years more may be added to its successful existence. But if the old queen fails *gradually* in either of those months, (in which case she would probably leave no eggs behind her from which to rear a queen artificially,) or any how in the other nine months of the year, the bees dwindle away and the colony fails. This is one among other causes of disappointment which many persons have experienced, who have gone to great expense in establishing apiaries, and managed them on the depriving system. They failed through want of foresight; they should have provided a remedy against the natural defect in this system, by changing the royal dynasty at least triennially, substituting a young and vigorous queen for an old and failing one. If this were judiciously and scientifically managed, together with a periodical excision of comb, I see no reason why an apiary should not maintain a perpetual youth, and any one colony flourish to an indefinite period. One way of supplying a constant succession of young princesses from external sources will be fully detailed in this chapter; but that the apiarian may securely depend on his own resources for this purpose, it will be advisable for him to keep a few cottage hives, in proportion to the size of his bee-house and the number of his colonies, although he will generally be able to procure his

young queens elsewhere and otherwise. Such hives, kept for this purpose, may be managed according to the instructions so fully given in the earlier part of this volume. They had better be purchased at the outset; and the bee-house stocked with swarms procured from them in due time, rather than with a swarm or swarms obtained at the usual season. No doubt, with due precautions as to the selection of such swarms, (see page 23,) the apiary will be as well stocked in this as in any other way; but there is this objection to it, that any considerable profit will be delayed an additional year.

I. *First year.*—Let us suppose, then, that a couple of strong stocks are transferred to the garden in which the apiary is situated, whether in spring or the previous autumn, from which two prime-swarms issue *naturally* in the course of the ensuing summer. That the apiary may start well, I would advise the return of both swarms, as already explained, (see page 34,) after destroying the old queens. In this way more powerful swarms, and youthful queens to boot, will be located in the bee-house.

Where the swarm is forced artificially, *with a view to the queen's destruction*, it must by all means be deferred until she has laid royal eggs; and, indeed, until it is ascertained that royal *brood* exists in the hive in a more or less advanced stage of forwardness, otherwise the delay

would be very great before the second issue of the swarm.

To ascertain this, it will be proper to drive the bees out of the hive, when, if it clearly appear that royal brood does exist, the swarm may immediately be dashed out of the temporary hive, and the queen sought for and destroyed. The bees will immediately return home (see page 36) and prepare for their second issue. One great advantage belonging to this artificial method of destroying the queen is, that the final issue of the swarm will be *so much earlier and more certain* than if the *natural* first rising of the swarm was waited for previous to destroying her; not only so, the bees will be less likely to fly away and be lost.

When the swarm re-issues[1], which will probably take place some time in the fortnight succeeding the old queen's removal—*i. e.* if the queen was destroyed according to the plan proposed above, —let it be hived first in a common bell-hive, and afterwards transferred to the box destined for its final reception, after which it may be removed the same evening to the bee-house.

I need hardly repeat that it will not always[2] be

[1] Observe, I would by no means advise the *compulsion* of the swarm on its *final* re-issue, except in a case of *extreme necessity*, chiefly because it would become greatly weakened by the return of a great part of its numbers to the old stand and hive.

[2] See Appendix, Note I.

necessary to destroy the old queen, however advisable, especially where her age does not exceed one whole year at the time of the issue of the prime-swarm. In this case, after the swarm has been transferred to its box, it will be moved off, as in the former instance, to its intended locality.

Now, in *both these cases*, second swarms or casts must be looked for. Where the prime-swarm was headed by a young princess, the cast will issue probably in two or three days. Let it be returned to the parent stock, as described at page 40, after cutting out from it the surviving royal cells. In this way both hives should be treated, so as to encourage their strong establishment for another year. In the autumn, if necessary, a sufficient quantity of comb may be cut away, supposing either of the stocks exceeded three or four years in age. Full directions as to every method of managing these stocks having already been given elsewhere, I shall not follow up their history in this place.

To turn our attention, therefore, to the two swarms now located in the bee-house. When first established in their new quarters, for some days at least, they ought not to be meddled with in any way, except in the event of cold or wet weather succeeding, in which case one of the holes at the top may be uncorked and a feeder slipped over it, covered with a pane of glass, and

something to exclude the light. The feeder may contain from 1½ lbs. to 3 lbs. of liquid honey or sugared ale. Of course there is no objection to inspecting the interior of the box by the windows supplied for that purpose, though even this in moderation at first, lest the bees, who are a fastidious people, should take a dislike to their new home, and decamp with the first opportunity. Bad weather will often succeed the hiving a swarm. In this case, where bees are left to themselves, there occurs often a very hurtful period of inactivity in the progress of the new works for want of material wherewith to construct comb. If, however, a constant supply of some rich food be given them, (by which I mean food in which the saccharine element prevails, which Huber tells us is more productive of wax than even honey,) they will construct comb in readiness to receive the often sudden and sometimes immense collection of honey which flows in from every quarter on the return of propitious weather. Bees would seem to know when an abundant harvest is at hand, hence they will often, especially in the height of the season, construct comb as if in preparation for it. Thus I have known comb-building continue most actively in a warmly-kept hive during several days of bad weather, when scarcely a drop of honey was being added to their stores. They will be also seen at such times to carry the honey which

they may chance in the hurry of the moment to have deposited in the lower cells into the higher parts of the hive, thus clearing the way for the easy deposit of future stores. This I have known them do in a side-box, in which the queen had not once laid an egg; therefore, the transfer of the honey could not have occurred in deference to her breeding wants.

If the season be good and the swarms strong, which they will generally be when the queen is destroyed, additional room will shortly be required. This should be furnished some time in the course of the third or fourth week; and first, by opening to them a glass or two on the top of the hive. Should the season be very good, they will also want the side-box, but this more rarely, owing to the large dimensions of the stock-hive. Still it will often be found advantageous in very hot weather to give the bees all the room possible, even though they may not absolutely require it for storing purposes. When the thermometer indicates a temperature of 90° for two days together, and the bees at morn or eve hang in clusters outside the hive, no time should be lost in opening to them all available space. With so large a population as will be almost sure to be attached to the new swarms, their large box will be filled in almost the same, or perhaps less time, than a swarm of the usual size would take to fill a box of the

ordinary dimensions; so that if 20 lbs. of honey may be yielded by the one over and above their own winter store, not less than 30 lbs., under similar circumstances, will be collected by the others.

In supplying the bees with additional room, the bee-master must be guided by circumstances. When his complement of stock-hives is complete, his object will be the harvesting of honey. In this case he will proceed as above, first opening a bee-glass, and afterwards the side-box. But should he desire a rapid increase of his apiary, and be content to forego any present acquisition of honey with this end in view, he may withhold all additional room *above* the swarm, and compel them to work solely in the side-box, *which must be made to take the place of the stock-box*, the latter being shifted to the right or left as the case may be. Thus, in passing to the open air[1], the bees will have to enter an empty box, in which, if necessity urges them, they will speedily begin to build. It will in general be occupied much sooner than if it were in its original position, remote from the entrance, and work a good deal more comb than they otherwise would do. Where plenty of additional room is afforded *in after years* in the shape of bee-glasses or *supers*

[1] The entrance to the hive, be it observed, must never be changed, otherwise the sacrifice of many valuable lives would be the consequence.

over the "pavilion" or main box; and a hive be treated in this manner, there will generally be found in this temporary *atrium* plenty of *comb*, well stored with pollen, (which will help to relieve the stock-hive of much of this often too abundantly-stored substance,) and only a third full or even less of *honey;* for bees *always* prefer to store honey *over* their main domicile, whither they will, as I said just now, transfer the honey temporarily stored in the side-box whenever the weather chances to be unfavourable to their moving out of doors and adding to their treasures.

The reason of the above proceeding and treatment of a hive is this, that on the arrival of autumn, *i. e.* the close of the honey season, out of the side-box an *artificial stock* may be formed, in a manner presently to be explained, to whom the stored pollen will prove a most acceptable boon. Every colony or swarm in the bee-house may be treated in a similar manner, and as many artificial stocks formed as there are colonies in it; so that, in fact, where all things go well, not only may the apiary increase itself by accessions from without, in the shape of swarms proceeding from the cottage hives, but it will *double itself within also.* The method in which this is effected shall be explained anon. I may add here, that in very good seasons, should the works in the new box appear to advance with much rapidity,

as soon as it appears *half full* of comb, (but not before,) a glass may be opened to the bees over the main box, in which they will store a good deal of honey for the bee-master's own use.

The method of removing such a glass when full being somewhat different to the plan pursued under the cottage system, I proceed to explain. It must first be broken up from its holdfasts of propolis, which glue it firmly to the top of the hive. The instrument employed for this purpose, be it knife or spatula, may also be passed right under the glass so as to sever the comb from its attachments within. This being done, thrust beneath the glass two plates of zinc sufficiently large, upon one of which the glass will be removed, while the other remains to cover the hole. Before doing this, however, it will sometimes be found of use to lift the glass about the eighth of an inch from the crown-board of the hive by means of small wedges or bits of wood or paper, to allow the bees to lick up what honey oozes out of the cells, that may chance to have been fractured in process of breaking the glass away from its attachments. Five minutes will generally suffice for this purpose before removing the glass, which must not be delayed too long, or the bees, having sucked up the spilt honey, will proceed to rifle all the cells in the glass, to the dismay of the bee-master. When removed, the glass may be treated in a similar manner to

that pointed out at page 45, its place being occupied with another, or else the hole filled up with a bung or cork. During the whole of this process not a bee need have escaped to annoy the operator. I have elsewhere stated, (see page 43,) that I deem it advisable to give no second glass after the first week in July: the first reason there alleged holds good in this case with the greater force, as it is desirable that there should be at least five or six pounds of *honey* stored in the box destined for the new colony.

Pass we now to the early autumn treatment of the bee-house colonies, (for I think enough has been said elsewhere to guide the apiarian in the summer management of his bees,) and the autumn is no idle time to the scientific amateur. If these colonies have done well, besides the glasses which may have been taken off, there will probably be found a considerable quantity of comb in one or both of the side-boxes of his two swarms, not, however, containing honey enough to tempt him to plunder, or, if tempted, to repay him for the plunder. Bearing in mind, therefore, what I have before suggested as to the costliness of wax, it will be his best policy either to preserve this comb to another year, (when it will be highly prized by the bees, to whom it may be given, whether old stock or prime-swarm,) or to make use of it at once by turning into it an expatriated doubled colony of bees,

procured from elsewhere expressly for the purpose, in other words, to make an *artificial stock* out of it. To this intent, the first thing to be done is to make a bargain with some one or more cottage bee-keepers in the neighbourhood, who are least foolishly superstitious about their bees, while they adhere religiously to the "good old plan" of the brimstone pit, as the best finale to the labours of the year. In most places the bribe of a sixpence or shilling will induce them very readily to give up their bees to the experimental apiarian. He should choose, if choice is afforded him, the strongest, fullest, and most populous stocks, which will generally be the swarms of the previous year, that have swarmed *once* in the course of the present season, for these stocks, having a young queen, will be in full vigour and promise. Next, those which are as distant as possible from his own apiary (say two or three miles off) should be bargained for in preference to those that are nearer at hand, as the bees will be so much less likely to wander off to their old haunts and perish. It is also desirable that the hives intended for plunder should stand side by side; nor must there be less than two such in the same garden.

These preliminary steps having been taken,—and they should be done in good time,—a fine day must be chosen, (as early in August as possible,) for the taking away of the side-box or

boxes from one or both of his colonies, according to circumstances. The removal of a box intervening between the stock-hive and the open air, is an easy matter in apiaries managed according to my plan, though it may appear an affair of some difficulty. I begin by thrusting in the zinc slides *between the boxes*, by which means I speedily ascertain in which of the boxes the queen happens to be. Should it be apparent that she has taken up her quarters in the box nearest to the entrance, after waiting some twenty minutes, I proceed to withdraw the zinc ventilating-slide *under* the hive-board of the side-box, having previously opened one of the windows in the room or bee-house,—all other lights being darkened so as to afford only one place of uninterrupted egress to the bees. If this be performed in the warmest part of a fine day, but few bees in general will be found in it, and most of these will have eagerly escaped in the course of an hour, and rejoined their companions in the other box. The ventilators should then be closed, and the box transferred to the place destined for the reception of the new colony, for, *in this case*, the *old* stock will receive the expected exiles from their own home. Should it appear, however, that the queen remains in her original palace, *all* the slides must be shut down, and the boxes shifted, *i. e.* made to change places, after which much the same

process will follow as in the former case, save only that the *new* box becomes the reserved dwelling-place of the new colonists, and to this end is removed to its prepared position. It matters not if a few bees are left among the combs, for they will either harmonize with their successors, or return to their old locality on taking their first excursion in the open air. The new box should be narrowly examined, previously to its establishment, as to the state of the comb which has been constructed in it. If, on inspection, there shows itself a too great abundance of *drone* comb, the *whole* of it had best be cut away, (at least as far as the ceiled cells,) as this would, in all probability, very materially injure the after prosperity of the hive. Whichever box becomes the habitat of the new comers, should be carefully weighed both before and after the bees are put into it.

And now for the method of peopling either of these hives: *adestote animis, lectores, et vos plaudite!* On the evening of the same day, (should the weather be of a settled fine character, it were better it should take place the *day before*,) let the bee-master,—duly armed with every necessary defence, and accompanied by an assistant bearing every requisite implement, including a similar box to that which the bees are to occupy,—proceed to the apiary in which the doomed hives are situated. If they stand side by side, it were

well to commence operations an hour before dusk, (for daylight, where possible, is of great advantage,) only let both principal and assistant be well defended against every possible attack. The process then to be adopted is as follows. First let one hive (the strongest of at least two) be driven into a temporary bell or cottage-hive. As soon as effected—after fumigating the old hive with sulphur to destroy what bees remain, and removing it in-doors,—turn up the second hive, (and here I must interpose—have nothing to do with casts only half full of comb; they give more trouble than they are worth,) and set over it *the same hive used in the former case*, into which the population of the first hive has already crept, and drive as before. The two families (and, indeed, *any number* of bees so driven,) will unite in the most harmonious manner, without the least attempt at fighting,—save only that the jealousy of royalty will demand a victim, and one of the rival queens will be executed before morning. Of all the methods of uniting bees hitherto practised, this, which is a discovery of my own[1], is undoubtedly one of the simplest and most effectual. It may *seem* hazardous; but I can testify, from experience, to its value, having tried it more than a dozen times during the last two years with the same unfailing suc-

[1] See Appendix, Note K.

cess. But to proceed,—the now united swarm in the temporary hive had better be located for the night on a stool exactly half-way between the position occupied by the two families before their expatriation. If, however, the old hives did not stand side by side, let it occupy the place of the *strongest* stock.

Having collected as many bees together as possible out of two, three, or more hives, and thus ordered them, patience must be had till the following day, when, at any time between 10 A.M. and 3 P.M., (but the later the better within this space,) the operator may revisit the scene of his last night's proceedings, and conclude the business. All that now remains to be done, is rudely to shake the bees out of the temporary hive upon the ground, in some open but shady place, in front of the box provided for their reception, whose edge must be elevated half-an-inch or so from the ground. It is evident that the box which the bees are finally to occupy may be used for this purpose, but only if there be no great quantity of bees, brood, or honey in it. If it chanced to be heavy, there would be some danger of the combs breaking down; on this account, I advise the use of a temporary box, which, when the bees have crept into it, may be placed on a board, and set on the stand which the swarm occupied the night before. Towards evening, when the bees are all

in, it may be carried off to the place destined for it, and set over the box which the insects are finally to occupy. They will all quickly descend, (the holes intervening having been previously opened,) and accustom themselves to their change of home. The upper box, when empty, may be removed.

Such is the method which I recommend to be pursued in every case where it is desired to form artificial stocks. If the process above explained be properly managed from beginning to end,—above all, if the bees saved have proceeded from *strong and vigorous* stocks, (*at least one* of the families in each united stock should answer this description,) there is every probability—I may say *certainty*—that, with a judicious and liberal supply of food up to the desired weight, (and every such stock ought to weigh neither more nor less than 20 lbs. of *contents* at Michaelmas,) it will become one of the strongest and most remunerating stocks in the whole apiary the following summer. Artificial stocks obtained in this manner have a double advantage, being both economical and profitable; for they will cost very little to the bee-master, while his apiary may increase itself as rapidly, when worked on the non-swarming system, as if his bees were allowed to swarm *ad libitum*. It will be at once perceived, that an apiary managed on this plan may be conducted in a bee-house,

without any assistance at all from garden-hives worked on the cottage system; I mean, that the apiarian may be altogether independent of swarming, which is a matter of great importance to dwellers in towns, who may hitherto have thought themselves debarred from the pleasures of bee-keeping, from their lack of a garden, and the consequent necessity of purchasing swarms. It will be seen, moreover, when I come to the next year's management of the apiary, that the increase of stocks may be managed another way, without the troublesome necessity even of procuring bees from elsewhere at all; so that one stock, well managed, may become the parent of a numerous apiary, *without even requiring the apiarian to move out of the room of his house which he may have devoted to keeping bees.*

There is yet another plan of forming artificial stocks, which I have tried with much success. I introduce a notice of it here for the benefit chiefly of those bee-keepers who are curious in such matters, and have the requisite leisure for conducting the somewhat tedious, though very interesting, process. It is this: after collecting together the population of two or more doomed hives, let them be placed in a *perfectly empty* box. If fed plentifully—and they should never lack an abundant supply of palatable food in their feeding-trough for at least a month, *i.e.* until the contents of the box reach 20 lbs. in

weight—they will construct a great deal of comb, and store away food enough to keep them alive through the winter, without requiring much, if any, additional supply in the spring. This method of rearing bees is, however, an expensive one, as they will often consume from fifteen to seventeen shillings' worth of honey or prepared food before their hive attains the requisite weight. If, however, the thing be well managed, a colony of this kind becomes exceedingly profitable. I reared one in this way through the winter of 1849, which yielded me 34 lbs. of the finest honey in the indifferent bee year that followed; and it is now (February, 1851) in the very best health, keeping up a much higher average temperature than any of my other stocks. If this plan be adopted, the stock should be formed as early as possible in August, when the queen, if a good breeder, will be tempted to lay considerably before the close of the year. The method, however, before detailed, is to be greatly preferred, for, the comb being for the most part already constructed, not more than from six to ten pounds of food need in general be supplied, at the cost of a very trifle, and this will put it on as safe a footing as any of the other stocks.

Towards the close of August (see reasons for mentioning so early a date in Chapter XI.) every hive in the apiary should be put on a pro-

per footing to stand the winter, by supplying to those colonies, which may be found deficient in weight, as much food as will bring them up to at least 20 lbs. of *contents*,—the garden hives should weigh a pound or two more, to make allowance for the increasing weight of the old comb[1]. For winter management all that is requisite, besides an occasional cleansing of the boards, is to keep off the effects of a winter sun in cold weather. The felt or drugget blind in the window-apiary will answer the purpose of a sun-guard well enough where the window faces the south. Besides this, in both bee-house and window-apiary, I take care to confine the bees close prisoners when the sun shines in cold weather, as I also do during the prevalence of a

[1] As to these cottage-hives, I have supposed before that it was intended they should qualify themselves to stand as winter-stocks; and to this end, casting, in both cases, should have been carefully prevented. If not more than four years old, and sufficiently strong in weight and population, it will be advisable by all means to keep them on to another season; should either of them, however, appear to be weak, or should it exceed four years in age, it were best, perhaps, to break it up as soon as August is drawing to a close. To this end, the bees may be first fumigated, or driven into an empty hive, and joined to their companions in the neighbouring stock; after which, cut out all the combs with care, and remove from them all that is still occupied with brood. This should then be dealt with as pointed out at page 102. Whatever honey is found in the hive, being of an inferior quality, will do admirably to mix with the food supplied to the artificial stocks.

high wind in mild weather, by pushing in the slides between the box and the wall in every colony, which keeps them in total darkness, be the glitter of snow or the sun's glare ever so bright. In the meanwhile it is prudent always to open the ventilators below, to afford them the necessary air. In calm mild weather, however, the bees should have free access to the open air, as exercise in winter, where it may safely be enjoyed, is of great advantage to them. On the breaking up of a frost, and after a general thaw, afford as much air as possible; also a current of air through the hive occasionally in mild dry weather will be found very beneficial, especially in wooden boxes, which are more liable to accumulations of damp arising from condensed vapour than the old bell-shaped cottage hive.

The process of board-cleansing, which I have before described in the instance of straw hives, may be thus conducted. Let an evening be chosen when the wind is blowing in a direction towards the apiary; then remove the blank ventilator so as to cause a rush of air over the floor-board, which will compel the bees to ascend up among the combs. This effected, slide the hive gently but quickly on to the board of its side-box, which must previously have been removed. After scraping and washing the board thoroughly—at the same time drying it by the fire—the hive may be pushed back again to its

old place without a single bee having escaped to annoy the operator.

II. I come now to the *second year's* treatment of the house apiary, in obedience to the plan and rule which I laid down to myself at the beginning. As to the early treatment of the hives, much the same attention will have to be bestowed on them towards the approach of spring as was recommended to be given to hives managed on the cottage system, including the judicious excision of mouldy combs. These, however, are not likely to be found so early in the history of a new apiary. Most writers on bees advise the partial feeding of even strong hives in the early spring. To this opinion I myself incline, having tried it with advantage. It must be done with much judgment, however, or it becomes of positive injury to the bees. In the case of stocks established in the natural way, there is nothing so good to feed with as warm diluted honey. Instead of this, for a stock artificially formed, the food supplied should be somewhat inferior in quality to that stored in the hive, as it is important that whatever prepared food was given them in autumn should be all cleared away before the honey season comes; and if a better food were given them, they might perhaps neglect it. Whatever food be given, it must be given only on mild calm days, when the temperature of the weather is about 50° and upwards.

To stimulate a hive, (for this food is given with this intent,) during the prevalence of high winds or cold showery weather, is to endanger its existence by inducing an injurious activity among the bees, who venture forth under its influence to almost certain death. In propitious weather, however, a tablespoon-full of food each day may be given with much advantage; but care must be taken in feeding to avoid creating a current of air through the hive, which would neutralize the beneficial influence of the feeding stimulus by reducing the temperature which the other tended to raise. Copious spring feeding, except where a hive is starving, is altogether to be avoided. It tempts many bees to neglect their duty to the young brood; besides that, in storing it away, they necessarily encroach on the queen's breeding space, and so positively assist in weakening the colony.

As the month of April speeds away, the strength of all the hives that have well survived the winter and the perils of the early spring increases daily, so that room will shortly be required. Before this is given, however, let the bottom boards throughout the apiary receive a final cleansing for the season. The in-door colonies on or about the first of May must next be supplied with glasses, duly furnished with guide comb. These, let me repeat here, must be carefully protected from the influence of cold

by thick woollen coverings of some sort: the warmer they are kept in general the better, though when the weather is very sultry they may be left quite uncovered. Bees will sometimes commence working in a glass as early as April, often in the middle of May. At this time it should be kept always covered, for the population will not yet be so numerous as to be unable to regulate the temperature for themselves. Be it also remembered, that comb-making is by all means to be encouraged, so that when honey abounds there may be ready-constructed room in which to store it. Never mind if the bees, on the return of ungenial weather, carry all the honey as yet stored down into the hive, when seasonable weather re-appears they will soon fill the cells up again.

As the year advances and the population increases, much attention must be paid to the seasonable supply of additional hive-room, some days, and even weeks, before it becomes absolutely necessary. Experience has convinced me that the existence of vacant space in a hive has a tendency to stimulate the bees' industry; however, let it be so given as not to reduce too low the temperature of the hive. *Now also is the time for the bee-master to provide for the autumnal increase of his apiary*, should he desire it, according to the plan before suggested, of which, indeed, we suppose him to have made trial the

year before. Whatever success he may have obtained then, now certainly he may (unless the season should prove extremely bad) have *four* boxes in the autumn, out of which to make as many artificial stocks, if he can get bees enough to tenant them. A further advantage there will accrue from this treatment of his stocks, viz., that by shifting his boxes, in the way pointed out a few pages back, and compelling the bees to pass from their hive into the open air through an empty box, much anxiety will be spared him as to the possible swarming away of his bees; for if the boxes be shifted in good time, say at the end of April, they will be sure not to swarm if space to work in be afterwards supplied to them as fast as they want it, and the boxes are well sheltered from the sun. *The earlier too the boxes are shifted, the greater heat* will be engendered in the stock, which, being moved so far away from the entrance, will be less sensitive of the changes of the weather; thus will the maturation of the brood be advanced the speedier. Plenty of spare room over the pavilion must be opened to them, as it is wanted; for in proportion as they have room given them to store above their proper domicile, the less honey will be deposited in the ante-chamber, out of which the new colony is to be made. Should the bees increase so greatly in numbers as to compel them to hang outside, from the alighting board, when all the

available space has been given them, a glass or box, even though not quite full, must be taken away, and its place supplied by an empty one. The partially-filled glass or box may be replaced later in the season, if, on removing other glasses or boxes, honey seems to be collected still in any quantity. His own judgment must guide the bee-master in his decision, as to whether he shall appropriate the contents at once or reserve it as I have just suggested, only be it borne in mind, that empty comb is of little value in itself, but a great boon to the bees, and a prize to their master himself in the end, if returned to him full of honey. Empty comb, however, is always useful to tempt them up into a glass or super, in the way of guide or decoy comb, especially if there chance to be a little honey in it: some ought certainly to be reserved and laid by for this purpose every year.

Let me now fulfil the promise which I made at page 146, to reveal to the bee-master a method of increasing his stock-hives *without the necessity of his moving from the bee-house*, so as to make him entirely independent of the process of swarming, or driving bees, as a means of stocking his apiary.

To form a stock of bees according to this method, it is simply requisite *to catch the queen-bee* of a *strong* colony some time between the end of the third week in May and the middle of

the month of July, *i.e. before the slaughter of drones has commenced in that particular hive, and while there is still much brood in it.* To secure the person of Majesty, with this end in view, may seem difficult in the case of a common box colony. In reality it is far easier than to secure the queen of a leaf or observatory hive, for she may be caught without the escape of a single bee—with the utmost coolness on the part of the operator—and even without laying a finger on the Royal Person. To succeed in this enterprise, however, the bees must have worked some comb in one or more bee-glasses, (the more the better,) the colony must be strong in population, eggs must be found in the stock-hive, and the queen must be still vigorous. These necessary points occurring together, nothing is wanting to success but the watchfulness of the operator. As June advances, and the bees' ardour in the collection of honey is at its height, scarcely a day will pass in which the queen of a vigorous stock will not appear several times in one or all of the glasses over *the stock-hive.* She is anxious to lay, but it is with difficulty (owing to the demand for store-room) that she can find suitable cells wherein to deposit her eggs. Indeed, it is only when by mere good luck she happens to anticipate her subjects in finding a cell just vacated by a young escaped bee, that she can lay with comfort; in this strait

she perambulates every part of the hive in search of breeding space, and in the course of her journeyings, among other places, she visits the bee-glasses. Now if at one of these moments (and they occur pretty frequently) the bee-master happens to be on the watch, the golden moment is arrived. Without loss of time let him thrust a couple of zinc plates between the glass in which the queen has appeared and the hive itself, and then remove the glass away on its plate, putting it aside till it is wanted[1].

The next thing to be done is to thrust in *all* the slides; after which remove the stock-box to the place in the apiary destined for the reception of the new colony, leaving the other box behind[2], which, if it have some comb and honey in it, is in so much the better circumstances. *Now* (if it have not been done before) set the glass containing the queen over one of the holes of this side-box, and one of the new colonies is formed.

A strict watch must now be kept upon the old box, whose occupants, (as at the time of the division of the colony,) are still imprisoned. Should the quicksilver rise to 100°, or near it[3], *part* of

[1] Air must be given to the imprisoned bees, or they might die of suffocation, especially if very numerous i) the glass.

[2] I suppose it to have previously intervened between the "pavilion" where the queen was and the open air.

[3] A *thermometer* is almost indispensable in the box for the perfect success of this operation.

the population must be suffered to escape—the box being kept as cool as possible in the meanwhile—until the heat descends to below 90°. If the temperature of the box should not rise beyond this, (or as soon as it has become reduced to this,) let the bees be kept close prisoners for forty-eight hours, by which time—*if there was suitable brood in the hive*—they will have commenced the formation of royal cells preparatory to the raising of an artificial queen. They may then, very early in the morning, or *better* towards evening, be released with safety; some may and probably will return to the old hive, but the great body of them will remain true to their new home and expected sovereign, having altogether forgotten their old attachments. Of course the earlier in the season this operation can be done the better, chiefly because that then no fears need reasonably be entertained as to whether there exists in the hive suitable brood for rearing an artificial queen or not. In one of my boxes the fact may generally be ascertained by looking in at the windows, of which the more—and the larger they are—the better. But, indeed, it may be taken for granted that a sufficiency of eggs, or larvæ of a proper age, will be always found in a good stock, worked on the depriving system, during the months of May, June, July, and August. The operation should not be attempted, however, later than July, for

a variety of reasons which it is unnecessary to specify.

To turn back to the straw hives in the open air. Bearing in mind that their queens are now only barely a year old, it will be unnecessary to destroy them this season. Therefore, soon after the middle of May (but see Chapter VII.) force artificial swarms from them. These, instead of being removed to the bee-house, for I doubt whether most of the bees, when forced to swarm, would not return to the old hive the following day—perhaps queen and all would decamp together—these, I say, had better be put into *large* straw hives, and made to take the place of the old ones, for permanent stock. Nine-tenths of the population may be driven out of the old hives, so as to strengthen to the utmost the condition of the swarms, in order that they may well fill their hives before winter. This they will probably do so effectually as to weigh from 50 lbs. to 70 lbs. of contents, glasses and all included, which may be taken from them. To anticipate the time, I would observe here, that if the weight of either of these hives much exceeded 25 lbs. of *contents* at Michaelmas, it were well to break up the top, and scoop out from the upper cells of the combs, *on one side*, as many pounds of honey as would reduce it to that weight or a little less: the reason of this spoliation I have elsewhere stated, see page 72.

The best way to treat the old hive under these circumstances, (*i. e.* after forcing the artificial swarms out of them,) is to make one good stock of them. To effect this, set one of them bottom upwards in a pail, which must be used for the next three weeks as a stand for the hive. Before turning the hive up in it, the pail should be firmly fixed to the spot by running three or four stout stakes into the ground close to it all round, so that no sudden gust of wind or accidental blow may knock it over. Having adjusted one of the hives, *the largest and freshest* in it, as explained just now, let the other be brought and fitted nicely over the other, so that the two hives shall form but *one family*. They must be well fitted together, first by thrusting long and sharp skewers of wood through the straw of one into the straw of the other, and plastering up the spaces between the hives through which the bees might creep in and out, taking care to leave only one hole for the use of the united families. This done, a neat hackle may be placed over the crown of the topmost hive. By the end of three weeks this colony will be very numerous in population, every bee having been hatched out of the cells which were left full of eggs or brood on the issue of the swarm from each. In this case it is not so necessary that *royal brood* should have been left by the old queen; in fact, it were perhaps *better* that the bees should rear a queen arti-

ficially, because at the expiration of the three weeks, she will probably not have laid a single egg yet in the hive. When this time is fully come, take off the *upper* hive, which will now be principally occupied by the bees, and set it on a stool provided for it, close to where it stood before, *i.e.* as close as possible to the pail. Now remove the *reversed* hive, whose combs and cells will generally be found quite empty of brood, and deserted by the bees, and cut out of it half the combs, on the side where they appear oldest and blackest. When I say "*half the combs*," I do not mean *entire* combs, but so much of them as appears to have been principally used for breeding purposes, for the upper part, although dark in colour perhaps, is sure to be good yet; in fact, it very rarely becomes black and old as the lower cells do. Having duly prepared it in this manner, take the former hive and drive all the bees out of it into the one just prepared for their reception. They may now be placed finally on the stool, and suffered to right themselves as best they may. As this will be done very early in June, there is every chance of these bees collecting a good deal of honey before winter, and replacing the removed comb with beautiful fresh cells, so that they will form a good stock for another year. Either this hive may be suffered to remain where it is, as a third garden stock, or it may be transferred to the bee-house

about Christmas, there to remain till the following spring, when the whole population may be forced from it at the usual time, as a swarm, and located in a box *in its place;* it may then be set over some other stock for the full period of three weeks, until every grub in it has been hatched out, after which let it be destroyed.

On the arrival of the month of August the bee-master will turn his attention to the stocks to be formed artificially. Hitherto his apiary has only increased by the addition of one garden-stock since the preceding autumn, unless he have adopted the plan detailed a few pages back; but it may now be enlarged from seven to eleven colonies, by giving to each of the antechamber-boxes in the bee-house a new population, each under a distinct government. The method of conducting this interesting series of operations has been already so amply explained, that it is needless for me to say any thing more here on the subject.

Before I wind-up this chapter to a conclusion, it remains for me to give a few directions concerning the best method of renewing periodically the once-established stocks in the apiary. I speak here of two kinds of renovation,—renovation of *comb*, and renewal or exchange of *queen* when she begins to wane in vigour.

Renovation of comb should take place not less

often than once in every four or five years. When it becomes desirable to effect this, all that is requisite to be done, is to set the old box in the spring *over*, instead of *at the side of*, the ante-chamber, when additional room is given to the hive. As comb is worked below, the queen will descend, for instinct leads her to descend as low as possible towards the entrance of the hive;—not only so, she will prefer the new and clean to the old and worn-out comb for laying her eggs. There is one objection to this plan, viz., that the bees will then store their honey in the upper hive among the old combs. To avoid this, which would materially lessen the profit derivable from this stock during that particular season, as soon as the bees have worked some comb below, thrust a divider between the boxes, (taking care to admit air to the upper box, by elevating it the eighth of an inch or so on thin pieces of wood,) and wait the issue. If the bees after a time get very restless above, it may be inferred that the queen is below, in which case suffer the bees to escape by elevating the box sufficiently on one side; if they refuse to leave the hive, it is a sign they have not discovered the loss of their queen, who, therefore, doubtless is among them. In this case the box must be restored, and the divider withdrawn. This should be repeated twice or thrice (or as

often as desirable) every week until successful. Having removed the upper box at last, cut out all the lower part of every comb, leaving two inches of each adhering to the roof, if apparently still good. The box should then be removed to some dry place till wanted for an artificial stock, or else, if not wanted for this purpose, it had better be cleaned out altogether, and be well scraped and scrubbed. If removed before June, it is evident that the now *young* stock may, and probably will, give some surplus honey in a glass or side-box.

There is yet another way of treating a stock of this kind. It is to manage it in the spring as if with the intention of forming an artificial stock; then to drive the bees, in August, out of the old box into an empty one, and to set this over the side-box, which is supposed to be partially filled with honey and comb. If thus treated every alternate year, the stock-box of every colony should have only *half* of its comb cut away at a time. It will thus be preserved in perpetuity, and may either have its former occupants returned, or receive a new queen and fresh population. In either case, whatever brood may be found in the box to be renewed, may, and ought (if in any quantity) to be saved. How this may be done has already been sufficiently pointed out in Chapters V. and VII.

To renovate a hive by substituting a young

for an old and worn-out queen,—whether she be three or four years old,—the plan to be pursued is still more simple, and no less efficacious, than that just advised for comb-renewal.

I may premise that one very serious objection to the depriving or non-swarming system, where it is followed in its integrity, (and to the existence of objections to it I have alluded before,) is to be found in this: that, owing to the absence of a demand for royal brood to lead off colonies, the queen sometimes lays no royal egg[1] at all in the hive; or, if she does lay in royal cells, the bees destroy the grubs before they come to maturity. Now, should this happen for three or four years consecutively, it stands to reason that the colony must perish,—I mean where the decay of the queen is *gradual*, when even the laying of worker-eggs is discontinued some time previous to her death, out of which a sovereign might be raised artificially to supply her place. To this, among other causes, must be attributed the very frequent casualties which occur in box colonies that are not suffered to swarm. I should almost be disposed to lay it down as an exception to the rule, where they thrive for more than four consecutive years to-

[1] I use the term "royal egg" in a popular sense; not that I believe the egg from which a queen is reared to be at all different from those eggs out of which the common bees proceed.

gether. Every scientific manager of an apiary ought, therefore, by careful observation, to make himself acquainted, as accurately as possible, with the age and pedigree of every queen-bee under his charge, so as to be able, by a judicious removal of the old queens, and the substitution of young and vigorous ones in their place, to preserve his colonies perpetually in thorough working order.

Now one way to do this is as follows:—

Let him procure from his cottage neighbours the population of their *strong casts* that are doomed to the brimstone pit. These may then be *driven* out of their several hives, and set over the colonies to be renewed, (one strong cast to each colony,) from which the original inhabitants, together with their queen, have been previously withdrawn. These last, on being driven, should have their queens destroyed, which will have the effect of compelling them to return home; here they ought to find their old dwelling (after being deprived of part of its comb, if need require) surmounted by the cast procured for the purpose. The bees above, however, should not be suffered to have access to the hive below till after some time has elapsed. A piece of perforated zinc interposed between the two hives for a few hours, will prove effectual in reconciling the natives and

the new comers together. This I recommend more by way of *precaution*, than from any idea of the danger of a fight, even on the immediate union of the two families. I have known the bees of two hives, located side by side on the same stand, fraternize [1] very curiously at swarming time, when the queen of one of the hives chanced to have been lost.

Should it be found a matter of difficulty to procure such casts from cottagers, (and they ought to be instructed to keep no *casts* at all,) the bee-master must manage to procure a supply of young queens at home. For this reason, if for no other, it will be advisable to keep several hives of straw in the open air, whose old queens may be destroyed every year, according to the plan detailed in Chapter V. Thus even the *spoliation-swarms*, managed according to my cottager plan, may always be made to contain youthful queens, by merely returning the swarms or their first issue, after previously killing the queens.

By a close attention to the directions contained in this chapter, (many of which, however, are in the main suggestive, rather than given as the result of experience,) there can be no doubt whatever of success; an apiary may have a pro-

[1] See Appendix, note F.

longed existence of perpetual youth, and of the most flourishing vigour, while the intelligent bee-master will not only reap a large reward for his pains, in the overflowing spoils of every season, but have the purest enjoyment in his scientific management of these interesting insects.

CHAPTER XI.

OF FEEDING BEES.

ENOUGH has been written by other authors on the importance of feeding bees, to render it unnecessary for me to detain the reader with any observations of my own in recommendation of it. Suffice it to say that no person deserves to succeed as an apiarian, who, in these days, neglects from whatever cause to establish his stocks in sufficient wealth in autumn, or to supply them in spring with enough food, to remove all danger of their perishing from starvation.

I have some few remarks to make, however, respecting the manner and time of feeding, the food to be used, and the vessels in which it should be given.

In the first place, where it can be done, I have no doubt that *top*-feeding is greatly to be preferred to every other method. To those who have holes at the top of their hives, the process of feeding becomes very simple indeed, especially in the case of box-hives in a bee-house or window-apiary. Here the apiator may feed his bees at any time, whereas in the open air the food can be supplied only at night, owing to the

perpetual annoyance from stranger bees or wasps, who, being quick of scent, in the autumn especially at a season when little honey is to be found in the woods or fields, will crowd around the hives that are being fed with surprising pertinacity.

Mr. Nutt's plan, (viz. feeding in drawers beneath the bottom-boards,) however it may answer in warm weather, *i.e.* when the external temperature averages from 50° to 60°, is wholly ineffectual under other circumstances. The bees will descend unwillingly, and at imminent danger of their lives. The same objection holds against the use of scoops of elder-wood, or plates thrust underneath the hive itself *upon* the board. But if the hole at the top of the hive, by which the bees have access to the feeder, be in the centre,—or where the bees chiefly congregate,—they will at all times eat more than others, and will continue to take food more or less actively, when the temperature is as low as 40° [1]. This fact is of great importance to be attended to, as the external temperature in general *averages* much lower than 50° in the autumn quarter of the year,

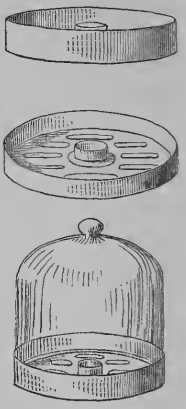
[1] Nay, at the moment I write, February 27th, with the external temperature at 32°, the bees are very greedily at work in one of my bee-glass feeders, (covered by a thick woollen sock doubled,) while not one has yet ventured forth, and there is not even a sign of activity in any other part of the hive. The internal temperature of this hive, however, is undoubtedly much higher in the centre, than it would otherwise have been.

while it seldom rises for more than a few days together to the higher figure, and then only for a few hours during the day. Where top-feeding is judiciously managed, bees may continue to be fed to a late period in the year, and of course proportionably early in the spring. I must, however, here caution the reader again to be very careful at this season to open the top hole as seldom as possible, and then only in the warmest weather, except in cases of urgent necessity, (or where a current of air is carefully prevented), as any escape of heat at this critical time is extremely injurious, when the development of brood should by all means be encouraged; and be it remembered, an internal heat of 70° has been considered necessary by the highest authorities to the hatching of eggs and the perfection of brood.

I make use of two sorts of feeders, both of them constructed of zinc[1], which for many reasons is greatly to be preferred to wood, except perhaps the very hardest kinds. The one pan is adapted to use (for copious feeding), *in warm weather*, when the bees will empty it sometimes twice a day (according to the quality of the

[1] The objection to zinc, on the ground that in very cold weather it endangers the lives of the few bees who chance to be tempted up into it, is I think unworthy of attention. The insects are generally careful enough not to venture their lives in this manner; and if they should, the bee-master has but to close the communication with the hive, at once to remedy the evil.

food): its shape and dimensions are as follows:—It is a circular trough or pan, from six to seven inches in diameter, and two inches in depth[1]. In the centre of its bottom is cut a hole two or three inches in diameter, into which is soldered a tube or cylinder of the same metal ascending one and a half inch into the pan, to whose inner side is accurately fitted a cylinder of leather, wood, or pasteboard, to facilitate the bees' ascent into the feeder; this they will themselves securely fasten in its place by means of propolis. The under side of the pan should be perfectly flat and level, so as to slip easily on and off the hole, whenever it may be desirable to close the communication between it and the hive. For this purpose it will be convenient also to have a small cap fitting nicely over the tube of ascent. There must also be fitted against the side of the pan externally a funnel-like piece of zinc, in shape



[1] The greater the diameter the less may be its depth, which is perhaps an advantage as saving the bees some trouble of ascent.

somewhat resembling a jug-spout, by which the liquid food supplied may be poured from time to time. Of course there must be some small holes punched in the side of the feeder against which it is soldered, to allow the liquid to run freely through. A pane of glass fits over the whole, through which the proceedings of the industrious insects may be watched at leisure. This pane ought to fit exactly on the edge of the feeder, to allow of as little escape of air as possible. Lastly, there must be constructed a float of some *hard* wood [1], having a hole in the centre to admit the ascending tube, so accurately made that while it rises and falls easily with the liquid beneath it, it is not so small in diameter, as to allow of any bees being drowned between it and the wall of the feeder. The thickness of the float may be about a quarter of an inch. To prevent it sticking to the bottom, three or four brads must be passed through it, here and there: these will elevate it about a quarter of an inch above the bottom. It is of little consequence if the bees can get under it, indeed they may be encouraged to do so, as

[1] I lay great stress upon the careful avoiding of *deal* in any shape as a vehicle for supplying food to bees, as I have found it has a tendency to turn it sour, especially if beer is an ingredient in its composition, but even where honey has been given to the bees with a deal float I have found it generate an acid —not only so, it seems to give a peculiar flavour to the liquid, which renders it after a time unpalatable to the bees.

they will often save the apiator the trouble of cleaning the feeder; while a little care in replenishing it will avoid all danger of drowning any that may have crept beneath it. To facilitate their speedy escape, the holes which are made in this float may be three-eighths of an inch broad, and extending within half an inch of the sides either way. I have also found it useful to apply two or three broad gutta percha, or india-rubber, bands to the *outside* of the ascending tube, which is a great assistance to the bees in finding their way back again into the hive.

My autumn or winter feeder, is exactly the same as the one just described in all respects, save only that the ascending tube does not exceed half an inch in height, or even less, by which means the bees can get in and out of the feeder with the least possible trouble and danger to themselves. Of course the *depth* of the feeder may be proportioned to the height of the tube of ascent, taking care to allow half an inch *at least* between the glass and the tube.

If a feeder of this sort be well placed over a hole communicating with the most frequented part of the hive, the heat which rises from the interior will make its temperature very agreeable to the bees, even in cool weather; in this case however it ought to be well covered up with flannel, to allow of as little escape of heat as possible. For *spring* feeding especially it

would be extremely advantageous to place a bee-glass (straight or perpendicular at the sides) in the feeder, fitting so closely against its sides that the float shall rise and fall within it easily. In this way, (supposing the glass had a warm cap over it,) even spring feeding would lose all its dangerous concomitants, as there would be little or no escape of heat from the hive below.

In the larger feeder, about a pound and a half or two pounds of food may be given at a time, without danger of its pouring down the centre shaft into the hive; while the smaller will afford them as much as they are likely ever to want in any single day, in cooler weather. I can confidently recommend these feeders to general notice, both on the ground of economy and usefulness. Their cost is trifling, and their management perfectly safe and easy.

While I give directions for the make of a winter feeder, I wish it to be understood that I by no means recommend winter feeding, *except in cases of extreme necessity*. Indeed, I believe most bee writers name too late a period for supplying the deficiency of a hive's weight, when they mention October as the most suitable feeding time. I would say, feed in August or September, or soon after the final deprivation has taken place for the year, *i. e.* as soon as the bees have ceased to increase their stores, or the

queen's autumn laying of eggs has evidently relaxed; and for this reason—while the weather is warm, and the bees therefore are more actively disposed, the process of feeding will be the sooner over, because of the more eager consumption of food on the bees' part; besides it will avoid the danger of weakening the stock, which so often takes place in cooler weather, later in the season, owing to the bees being induced to quit the hive, in the vain search for food—and they *will* leave the hive under such circumstances, how often never to return! Not only so, the earlier artificial food is supplied, of course the more *honey* will survive the winter consumption for the spring use of the young bees, and the earlier and larger will be the bee-master's spoil another year.

The best food undoubtedly is honey; but they will thrive (I believe my experience will warrant me in saying) *equally well* on various kinds of artificial food, in which, however, honey ought to form no inconsiderable ingredient. As a rule, I should say, feed with honey slightly diluted in spring, and with prepared food in autumn. I can recommend the following compound as being both economical, and certainly very agreeable to the bees,—witness my having reared one stock upon nothing else through the winter of 1849, and two stocks (at least

till the middle of March—the time of going to press) through the winter of 1850. The recipe for making it is as follows:—To a quart of wholesome table-beer (neither too fresh nor too old) add three pounds of Barbados sugar, or (better still) *coarse loaf sugar*, a glass of sherry[1], one and a half or two pounds of cheap honey, and a teaspoon-full of salt: the whole having been mixed together, and boiled for five minutes, will make about half a gallon of food, with the addition of a little water, which the bees will devour with ready gusto. The sherry, I doubt not, acts as a beneficial stimulus to the bees; and it certainly much improves the flavour of the liquid, although it also somewhat materially increases the expense.

Mr. Payne and Mr. Taylor both urgently recommend barley-sugar as a useful food for bees. It is, however, troublesome to make, and is, further, almost, if not quite, as expensive as honey itself. Moreover, it requires the presence of a certain degree of heat or damp to assist the bees in converting it into a liquid, not to speak of the length of time which is taken up in the process of consumption. I must also confess, it appears to me somewhat a work of supererogation to turn a fluid into a solid, for the purpose of feed-

[1] This may be omitted if thought necessary.

ing insects who must reconvert it into a fluid before it can be of any possible use to them. It is well, nevertheless, to know, in case of emergency (as when the bee-master must be unavoidably absent), that a side-box filled with barley-sugar will save his impoverished hive from all danger of starvation.

CHAPTER XII.

OF CERTAIN INSTRUMENTS, EITHER USEFUL OR NECESSARY TO BEE-MANAGEMENT.

Besides the different articles of use in the management of an apiary described in the early part of this volume, or in the course of the work, there are one or two instruments which I should wish to recommend to the reader's notice before I conclude.

Instead of the zinc slides which command the *entrance-way* spoken of in the two last chapters, of which some will have to be plain, and others perforated with holes; a plate similar to that described by Mr. Taylor (see his "Bee-keeper's Manual," page 75, *fourth* edition) will be found very useful. To quote his words,—it is "a square sheet of well-flattened tin, zinc, or copper, of four equal sides, made to slip down in the grooves Each side of the square gives an altered mouth to the pavilion at pleasure, according as it is turned, being cut with various sized apertures; and one entirely closed except the perforations for ventilation." Of these plates (which will be attached to the *entrance-blocks*) one will suffice for each colony, besides

the complement of other slides in the *hive-boards*.

A *bee-dress* to which I have alluded before, is another indispensable article of bee-furniture. "Security from attack," says Mr. Taylor, "is essential to self-possession:" "the first thing therefore that should be procured by the amateur is a bee-dress; a simple covering of light canvass, or strong gauze (green is the best colour for comfort), of the kind called *leno*, with or without sleeves, but securing the whole head effectually, will answer the purpose sufficiently well [1]."

No apiary should be without a long *spatula*, and a set of *bee-knives*, each of which will greatly facilitate the processes of comb-renewal, extraction of brood-cells, and excision of the cradles of royalty; not to speak of their use at the time of the honey harvest. These may be of two kinds if thought necessary; of which the one is in shape like a cheese knife. The other (and the most useful) is a piece of metal, say a foot long exclusive of the handle, not thicker of necessity than a goose-quill, but having a kind of thin blade at the



[1] Mr. Taylor has given a sketch of a very advantageous form at page 176.

end, turned at right-angles to the staff, and sufficiently flat and sharp to *cut* through the combs without *bruising* or *breaking* them. It must be pushed in between the combs, pressed firmly against the roof of the hive, and twisted round: this will bring the blade in contact with the combs on one side or the other, according to the intention of the operator.

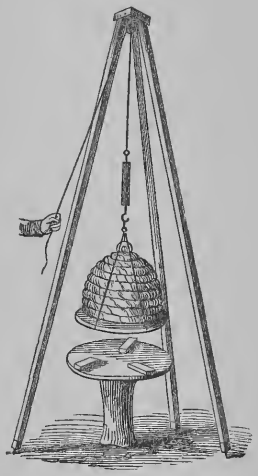


An instrument of very great importance to a large out-door apiary I have had constructed for my own use, and I can confidently recommend it to the practical apiarian. It is a *weighing-machine*, and it consists of three poles of stout wood equal in length, and seven feet high, fastened by hinges to a triangular block of wood four or five inches thick.



The sides of the triangle may be severally six inches wide. The poles must have spikes at the other end, to keep them immoveably fixed in the ground. This *tripod* (if I may so call it) is so contrived—the legs closing together—that, when not wanted, it can be easily stowed away; at the same time that it is readily removed from one hive to another. To the under side of the

triangular block is fastened a pully-wheel attached to a screw which penetrates the centre of the block. Over this wheel a cord passes, one end of which is held by the hand, while to the other end is fastened a spring balance[1], with a hook attached to it. Three strings tied together at one end, each with a hook at the other end, to catch three eye-screws fixed at equal distances in the hive-boards, (which of course must be detached from the pedestals,) are suspended to the balance in such a manner that the apiator, on pulling the cord, will at once haul up the hive in a straight line. An instrument of this kind, it is evident, must greatly facilitate the process of



[1] Either a Salter's balance, or one of those old-fashioned commoner sorts of iron balances, price 1*s.* 6*d.* or 2*s.*, will answer the purpose well enough.

weighing garden hives, which may be repeated as often as is desirable without the least trouble. I have frequently used this machine in summer time, when the bees were in their highest state of activity, without at all disturbing them: they fly in and out, and show no signs of annoyance whatever. As it requires some exertion of force to haul up a heavy hive, I would recommend the use of a set of pulleys suspended from the centre of the triangular block; these will materially facilitate the process of weighing.

And now that I have drawn the practical part of my work to a conclusion, let me wind up my labours by wishing the candid reader as much success in the scientific management of his bees as has attended, and I am persuaded will yet attend, the pains which I do not grudge to bestow on the study of these admirable creatures. And while I wish him success, I do more; for in this is included the pure pleasure and the serene enjoyment which must be experienced in no small degree while giving a close attention to the habits and history of perhaps the most intelligent, the most provident, and the wisest of all the creatures, inferior to man, wherewith the good Providence of God has peopled and adorned

this lower world. If the wisest of men pointed a proverb, by drawing the *ant* from her seclusion; no less does the bee merit attention as an example of industry, patience, sobriety, and loyalty. Let whosoever is awake to the voice of the CREATOR speaking through the works of His hands, OBSERVE, REVERENCE, and OBEY.

APPENDIX.

NOTE A, p. 17.

On the subject of the preference of bees for cool places, De Gelieu, the celebrated Swiss apiarian, writes as follows: "It is commonly believed that an apiary is not well situated unless it stands in the sun. This is an error: bees like the shade when working, and like the sun only when in the fields, which then animates and sustains them They thrive well in thick forests, and delight in them, because there they find a uniform temperature, and a propitious shade It is a mistake to suppose that hives, exposed to the sun, produce the earliest and the strongest swarms; I have oftener than once experienced the reverse. My earliest swarms have generally come from the best shaded hives, and which only receive the sun late." This testimony, coming from an apiarian of so much practical acquaintance with bee-keeping, gained during the experience of sixty years, is most valuable. Strange that it should have been so little acted upon, seeing the estimation in which Gelieu's work is justly held among us: but it requires no little judgment to select a favourable situation, in a northern aspect, for locating bee-hives. The place chosen must be snug and sheltered. The hives must be protected from high winds; and especially from sudden gusts, or continued currents of air. These will often destroy hundreds of bees in a few minutes, especially during squally weather, in March and April. The bees are now anxious to avail them-

selves of every gleam of sun-light; but if a sudden storm comes on, with wind, they soon get fatigued, and on returning home not a few fall powerless to the ground, never to rise save where the sun shines upon and revives them. Hence, in windy weather my bees are kept close prisoners till May at least.

I may mention here, that, when looking out last autumn (1850) for a suitable place where to bestow two experimental or artificial stocks, belonging to an apiarian friend, we fixed upon a hay-loft window, directly facing the north, which looked down upon a yard well protected by tall trees on every side. One of these hives, composed of *two* families united, regularly fed on artificial food, and this alone, weighed upwards of 20 lbs. of contents on the 28th of November,—three months after its establishment. The other, consisting of but *one* family of preserved bees, driven from a strong stock, which had swarmed in the spring, weighed half this weight at the same time. Both these hives are now (March 20th) in the very best health. The second stock was observed to carry pollen so late as the 4th of December; which, I make no doubt, the other also did. I am not aware, from my own observation of these hives, and the information I have besides obtained respecting them, that they have been less disposed to move than other bees located full in the sun, save only in the latter end of winter, which is decidedly an advantage. Even on dark days (when the weather was mild) they came forth with the same alacrity as other bees.

NOTE B, p. 31.

I HAVE been curious to see what the best authorities have advised on the subject of the proper dimensions of bee-hives. As the result of my investigation may not prove

uninteresting to many who have not the opportunity of referring to those writers, I do not scruple, even at the hazard of prolixity, to entertain the reader with it.

In favour of large hives, on the *single hiving* or *swarming* system, I find an array of weighty names, such as those of Butler[1], Sir J. More[2], T. Wildman[3], Keys[4], De Gelieu[5], and Bonner[6], among the bee-masters of

[1] "Hives are to be made of any size between five and seven gallons, that any swarm, of what quantity or time soever, may be fitly hived. The middling size of *three pecks* is most profitable."—Butler's *Feminine Monarchie.* Oxford, 1634.

[2] "Your hive must be of any size between five or seven gallons, that any swarm, of what quantity or time soever, may be fitly hived."—Sir J. More's *England's Interest.* Fourth ed., London, 1707. It appears that More copied from Butler, or both from some third source.

[3] Wildman, as is well known, was an advocate of the double hiving (I will not say, *storifying*) system, and recommends a small-sized hive; yet I quote him here as an authority in favour of *large* hives, on the *single hiving* principle, because it is evident that there is no real difference whatever between one large hive and two smaller ones affording the same room, where these are put together *almost immediately*, and the second *nadired*, *i. e.* put under the first. Where hives are *supered* (which alone is properly termed *storifying*), the queen is confined to the lower hive (in nine cases in ten); but where they are *nadired*, not only does she fill the upper hive with eggs, but, as comb is built below, she also occupies and breeds in the lower box; and the *sole* object I have in view in recommending the use of large hives, is to *encourage the queen's breeding* for a longer time than usual.

[4] Although Keys is a decided advocate of storifying (proper), I find the following remark in his Treatise (a new edition, London, 1814): "I think, in the single method, no hive should be less than three pecks, or perhaps a bushel, but not more than twelve inches in height."

[5] De Gelieu says nothing certain as to the *size* of hives, but, speaking of their shape, he has some observations which lead me, I think justly, to include him in the above list. "I have invariably remarked," he says, "that bees thrive better in low hives than in

more ancient times; nor are there wanting among the moderns several, I may say *many*, stout advocates for the use of large hives. On the other side are to be found no old-established names that I have become acquainted with. The earliest advocate I know for small hives on the single system is Dr. Bevan (a great authority certainly in most bee-matters), in whose train follow a host of supporters well and favourably known to the modern apiarian world, including Mr. Golding, Mr. Payne, Mr. Taylor, and others; all of whom, however, are, from acknowledged experience, better versed in the details of storification or collateral than of single hiving. None of these recommend a size larger than thirteen and a half inches in diameter by nine inches high.

From what has been written above, it will appear that most English apiarians of the present day, including all the storifyers (properly so called), favour the use of small hives. On the Continent, however, large hives are still in vogue; and if we want to see the profitable management of bees on a large scale, it is thither we must go;—

high ones; that, in general, those which are *broad and flat*, or *extended horizontally*, amass more honey, thrive better, and give out stronger and earlier swarms, than those which are high and *of several stories*." Among the reasons which he gives for this opinion, is the following weighty one, of which I most cordially approve: "A hive thrives ONLY *in proportion to the success* or *perfection of its* BROOD COMB," which, he argues, must be generally defective in other than "low, flat hives, (of course, *single* hives and *large* ones,) in which the heat is more easily concentrated."

[6] "As to the size, a hive that will hold about two and a half pecks, Linlithgow measure, will hold a pretty large swarm; but there is no certain rule to judge what hive will be exactly filled by a swarm. Much depends upon the succeeding season. If the swarm be early and large, it will require a large hive; but, if otherwise, the hive should be proportionably less."—A New Plan, &c. Edin., 1795.

to the eastern countries of Europe more especially, where bee-keeping is as important a branch of rural economy, as sheep-walking or grazing cattle is with us.

The attention of English apiarians has lately been drawn to the bee-practice of these countries, by the work of a Pole, which issued from the press not a year ago. Mr. Dobiogost describes the hive of his country, as being *from three and a half to five feet in height*, about eight inches in diameter at top, increasing downwards gradually to twenty inches or more at bottom, *all inside measure!* This is indeed a large hive, which our sceptics will attribute to the invention of gentlemen of the long bow, from their utter ignorance of apiarian lore. It is a fact, however, that such are the dimensions of the hives commonly in use in Poland; and it is also a fact, that, large as they are, they yet contrive to swarm with as much regularity as the hives in use among us, while the parent stock remains vigorous notwithstanding, for many years together. Mr. Dobiogost assures us that an apiary, containing a hundred stocks of this size, will throw off about 150 swarms every spring, each of such formidable power, that it resembles a small cloud, when hovering in the air. It seems to us almost incredible, that hives of such dimensions should throw off any swarms at all. In opposition to the general belief among us, the author seems to attribute this circumstance to the fact, that, on the first establishment of these stocks, *four times as many bees* are put into them, as we are in the habit of hiving together.

Such are the plain facts alleged by Mr. Dobiogost in respect to Polish practice; now let us look into the reasons of them. I find that Dr. Bevan scouts the idea altogether, that strength in one year begets strength in another, at least in any reasonable proportion; and he has brought forward the result of some very interesting

experiments in proof, which I once thought conclusive. Indeed, I still think that he is quite right in the inference he draws from them[1], when speaking of *English hives, and our general mode of bee-management*, seeing that he has, I think, very satisfactorily proved, that bee-life does not extend itself in general beyond six or seven months at the outside; for, according to his showing, every bee born before the middle of July perishes soon after, if not before, the middle of the following January. I say, he is right, when speaking of our, i. e. *the small-hive* system of bee-management, because, in *such hives*, be they single or storified (observe, I do not include *nadiring*), the queen-bee is seldom able to lay above a dozen eggs a day, if so many in the height of the honey-gathering season, owing to the bees seizing every cell, as soon as it becomes vacant by the exclusion of brood, as a receptacle for honey. This is the history of the wide gap which most apiarians, from Huber downwards, have observed between the spring and autumn laying of the queen-bee. It is not that she is *unable* or *indisposed* to lay, but that *she has no room in which to put her eggs*. Dr. Bevan tells us that there are two distinct layings of the queen: one, which he calls "*the great laying*," taking place in the spring; and a second, a lesser one, in the autumn, *i. e.* in the month of August, sooner or later, according to circumstances. In other words, he gives us to understand that there is an interval between the spring and autumn layings of the queen, in which but comparatively few eggs are laid. If by this he means

[1] viz., That however strong the population of a hive may be in one year, that strength will in no wise influence the prosperity of the same stock the following season, because how many soever the swarms that may have been introduced into one and the same hive in any particular year, they "will all have paid the debt of nature before its expiration."

that there is a considerable *suspension in the development of* BROOD in this time, there cannot be a doubt about it, *where the hive room is circumscribed* (whether side-ways or downwards); but if he would have us believe that the queen so *relaxes* in her *laying* of eggs, as almost to discontinue them towards the latter part of June, and the most part of July, I think he is mistaken. The queen, I believe, finds no sudden disinclination to perform the office of a mother; it is a gradual process on her part; she continues to lay, during that period, with diminishing energy perhaps as the season advances, but certainly with greater good-will and capability than in August and September. The truth, however, is, that, lay as actively as she may, she is *unable* to *deposit* her eggs in cells, owing to want of room. Every cell is, at this season, required for storing honey; therefore, if she does not swarm (in which case she at once effectively resumes her office, and as fast, and so long as comb is built *downwards*, she fills every available cell with brood[1]), she lays her eggs at random, any where, and there is what is *called* a *cessation* or a *relaxation in her laying;* i. e. a perceptible diminution in the quantity of brood-comb, and bees hatched, until honey begins to come in more sparingly, when the cells again become empty, and the queen resumes her comfortable deposit of eggs in them. This I believe to be the course with all small hives in general. It does not mend the matter to supply room *above;* for, where the bees begin their works from the roof of the new store-room downwards, the queen very rarely ascends, as she is loath to quit her hold of comb, and there is none to connect the new with the old works,

[1] And she generally anticipates them here, occupying each cell with an egg as fast as it is constructed, before the bees can put honey in it.

so as to tempt her up, if she were disposed to climb. And again, where the bees work *upwards*, as they often do, the comb is occupied with honey as fast as it is constructed, because it is an instinct of the bees to store their food high up in the hive; for which reason, as a saving of labour and material, they usually build drone-comb. Not only so, the queen equally obeying an instinct of her own, prefers to remain as near to the hive entrance, *i. e.* as low down, as possible, whence she loses the opportunity, if opportunity there is, which may happen to be afforded her. Often have I observed a queen-bee, about the middle of June, when every comb was more or less filled with honey or brood, after perambulating the hive, stand on the edge of a comb, and lay egg after egg, which were devoured by the bees as fast as they issued from her body. Now will any body assert, that, if this queen had had plenty of empty comb in which to deposit these eggs, during the next six weeks, strength of population in one year, would not beget a proportionate strength in another, especially after a mild winter, followed by an early spring? Would there not have been many more bees hatched, which would survive the perils and losses of autumn; and increase, therefore, the winter temperature of the hive, and so promote the earlier breeding in spring? It stands to reason that there would. It is for this reason, that an argument in favour of large hives will, I think, be found in the acknowledged fact, "that dry seasons produce most honey, wet ones most swarms." For what does this prove, but that the little honey collected in the fields has enabled the queen to deposit more eggs in the cells, (and at such times she will breed largely even in a *super*,) so that the population has increased so much the more rapidly, and with inconvenience to the bees? on which account they seize the first favourable moment to be off.

Now let us take the case of the deep Polish hive of Mr. Dobiogost. The bees of course are huddled close together near the top, in the depth of winter; there they first clear the comb of whatever honey may be stored in it, and there the queen begins to lay. The shape of the hive near the top is admirably suited to the diminished size of the population, although, as I shall presently show, they are, in proportion, much more numerous than any of our stocks of bees at this season. The concentrated heat[1], further husbanded by the very solid materials of the hive, fosters, even in the cold damp Polish spring (when the snow-hills begin to thaw), an early development of brood. As the population increases, a greater quantity of honey is cleared away, and more cells emptied for the queen's convenience. Downwards and sideways silently but steadily expands the population, until the spring is fully advanced, at which time the bees of Poland are in a far more forward state than ours; which are too often miserably reduced in numbers before they begin to breed. From this time, their progress is rapid indeed: what cares the queen of such a colony when the honey season approaches? The spoils of the year, rifled from a thousand different flowers, are first stored high up in the hive, against the coming winter, while, as the cells fill, the mother-bee is only driven to a lower story; for there is plenty of room in her four or five-foot-deep palace, both for her own incommoded laying of eggs, and the uninterrupted storing of honey. The judicious excision of comb by the careful bee-master in the early spring is rather an advantage

[1] Even Gelieu, notwithstanding his eulogium of flat, broad hives, seems to have been fully alive to this important feature in the Polish bee-domicile. Thus he says, "it is perhaps for this reason that bees thrive well in conical or sugar-loaf shaped hives, which are common in some countries."

than an hindrance to her; for the bees work beautiful fresh combs, along the edge of which she is generally to be found, depositing her eggs in the cells often before they have attained their completion, and certainly before the bees have felt the want or inclination to anticipate her, by converting them into honey-stores. Thus June passes away, but brings her no anxiety, as it does the unhappy English queen-bee; it only leaves her half-way down her spacious dwelling. July and August come, and still there is no necessary intermission to her labours, unless, indeed, as is very probable, the population of the hive has so greatly increased, that she thinks it more comfortable to migrate; in which case off goes the swarm (as early perhaps as mid-June), "so powerful, that it resembles a little cloud in the air." In the meanwhile, a younger and more vigorous queen succeeds to the vacant sovereignty, who, with more comfort than her predecessor, at last, owing to the diminished heat, and the less pressing demand for honey-room, resumes the task of breeding, and continues it until the autumnal cold gradually relaxes her maternal cares, and drives her up among the combs.

The English bee-master will, I am aware, object with me to the Polish system of bee-keeping, that it does not provide for any collection of a *purer kind of honey*. This objection is a most solid and weighty one, as, whatever the Pole may get in *quantity* of honey, he certainly loses in *quality;* as Gelieu observes, these hives "have this disadvantage, that *capes* (or super hives) cannot so easily be fitted to them, which facilitate the collecting of the finest honey." But all I contend for is, that we should meet this system half-way, by adopting large hives on the *single* method, where, especially according to my plan, the hive is kept principally for breeding or swarming purposes, and not so much to make a honey profit of

it. And I am persuaded we should thus get in general much more powerful swarms for our spoliation hives, and by consequence, a much larger harvest of honey.

NOTE C, p. 48.

Bonner (to whom, as a practical, experimental, and soundly-reasoning apiarian, I am disposed to pay very great deference) has the following observations on the winter-management of bees:—

"When the frost is severe, or when the snow is lying on the ground, it will be necessary to prevent the bees from coming out of the hives by shutting up their entry quite close with pob-tow, which will keep them warm, at the same time that they will run no risk of suffocation in very cold weather. In extreme cold weather the bees may be taken into outhouses, which will preserve them from cold. But, indeed, when the hives are properly covered, and the entries to them closely shut up, they will resist a very severe cold.

"Many ingenious gentlemen have tried different methods to preserve bees in winter. Some have shut them up in cold outhouses from September to April; others only from the first of November to March. A third class place grates before their entries to admit air, but keep the bees close in their hives during the whole winter."

He then observes, "that in general long confinement is prejudicial to the health of the bees I have seen the bees that have been long confined by cold (perhaps for ten weeks) so diseased, that when good weather returned, and they came abroad, very great numbers would have died within a day or two thereafter, and the hive in general would have been greatly reduced. It is evident that their long confinement was the cause: but it is also certain, that even in those cold countries where the winter

lasts eight months, bees thrive and prosper well I have known bees do well, however, that had been confined in their hives for five months, even in this country; while others of them were ready to perish by retaining their fæces for so long a period."

Touching the vexed question of the superiority of a mild over a severe winter, or the contrary, he remarks: "It is said by many writers on this subject, that a fine winter is dangerous to the bees; and that many more of them die in a mild than in a cold one. They argue, that as the appetite of the bees increases by their going often out, they consume their provisions and die of famine; whereas, when long confined in their hives they hardly eat any. I acknowledge that in a mild winter they do eat more food than in a cold one when they cannot get out; but this, as well as the fine air, contributes greatly to their health, besides that they hatch earlier, and consequently increase in the number of bees in the hives sooner. The fact is, that experience may convince any person that many more bees die in severe winters than in mild ones. In winter 1776, which was very cold, a great number of bee-hives perished; and also during last winter, (1794–95,) being an excessively severe one, many hives were destroyed from that cause alone; whereas in winter 1779, which was remarkably mild, not one hive in twenty failed; and the bees in general swarmed a month earlier than usual."

NOTE D, p. 67.

I know not whether for *cottagers* Wildman's method of bee-management, after all, be not the simplest as well as the most profitable. He puts a swarm into a small-sized hive, (ten inches broad by seven deep,) *nadir*-hiving it as soon as the bees have fairly begun to work comb in the

super, i. e. "often," as he says, "*the following morning*[1]." According to his plan the queen fills the upper hive first with brood as fast as comb is constructed; and when every available cell is occupied by an egg, and the bees have continued their works to the lower hive, (which will be towards the end of the first week or ten days,) the queen also descends, and breeds permanently below. In the mean while, as fast as the young bees above are hatched out, the vacated cells are filled with honey, so that by the end of a month (three weeks, Wildman says) no brood will be found above whatever, but an abundance of fine honey in comb but little less pure than virgin-comb, because they will only have had *one* set of young grubs hatched in them. I have frequently taken honey from such comb, and can speak very favourably of its quality. As soon as the top hive is full of honey it may be removed, (often within a month of the swarm's establishment,) and a third hive placed, not *over*, but *under* the remaining one. In some extraordinary seasons the upper of these may also be taken away, and a fourth placed under the third. In either case the two boxes or hives last given must be suffered to stand together through the winter, so that the queen may have both to breed in the following spring and summer. It is evident in this way that the prime-swarm would be a large one, (supposing the queen to be in full vigour,) because the queen would have ample space to breed in; nor would it issue much, if at all, later than the swarms out of ordinary hives. As soon as the prime-swarm has issued, Wildman directs that another hive should be set under the others, and *all casting prevented*. Should a cast issue, its queen must (he says) be searched for and destroyed,

[1] Of this, however, I am inclined to doubt the advantage; at least *four* days should be suffered to elapse before giving the second hive.

when the bees will return home again. This plan, however, may often fail, owing to the successive issue of casts with every young queen who proceeds from her cradle but the last. I have heard of the reissue of casts twenty times in one season from the same hive, during all which time the bees were in a constant state of agitation, and collected no honey! The only effectual plan to be pursued, is this, which I have advised in this book,—on the issue of the first cast, to turn up the hive and cut out every royal cradle that can be seen. This done, the queen may be destroyed (because there is already another queen in the hive) and the cast returned.

NOTE E, p. 86.

Touching the fecundity of the queen-bee, I am persuaded much error prevails among the majority of bee-keepers. Huber's opinion was, that in the prime of the season (in April and May) about 12,000 eggs are laid, which is at the rate of something like 200 a day. I have, however, long thought Réaumur's statement far nearer the truth, which gives us about 400 a day as the average. Dr. Bevan observes, that "this variation (in the accounts of the two naturalists) may have arisen from variety of climate, season, or other circumstances." Climate and season, doubtless, do exercise a great influence on the prosperity of bees; but I cannot think the difference of these so great as to prevail in any European country to affect the average of the queen's fecundity to so remarkable an extent. I think we must look for a solution of the difficulty to the "*other* circumstances" at which Dr. Bevan hints. Might there not have been some disparity in age and vigour between the queens which severally came under the observation of these naturalists? Or would not the use of small or large hives, as I have suggested before,

explain the difference? May not Réaumur have formed his opinion from the data furnished from observations made with the help of his great pyramidal hive, while Huber's hive was of small size? May not Shirach too (who resided at no very great distance from the confines of old Poland) have made use of hives similar to the Podolian hive? And he states his belief, that a single queen will lay from 70,000 to 100,000 eggs in a season.

Since I penned my former note on the subject of large hives, my attention has been drawn to the remarks of a Mr. Pettigrew, who wrote a series of articles about nine years ago in the "Gardener's Chronicle." His observations in general appear to me exceedingly just. As they bear very much upon the subject of this note as well as of the former, I may perhaps be pardoned for introducing in this place one or two extracts from his paper of Jan. 6, 1844.

"No person (he says) will ever pretend to say that a queen-bee can cease to lay when she likes, or that she has control over the number of her eggs." He then suggests an experiment "to show that by keeping bees in small hives you force them to destroy two-thirds of the eggs which queens lay." Next adverting to Dr. Bevan's remarks, already referred to, as to the quantity of eggs (12,000) deposited in his hives "at the principal laying, in April and May," he observes, "if the Doctor would be at the pains of putting a swarm, or two swarms united, weighing 8 lbs. or 9 lbs., with a queen that has finished her *principal laying*, into a hive containing twenty-four superficial feet of comb, he would find at the end of seven days above 30,000 eggs set." At page 124 (of the Honey Bee) he says, "whatever advantage the putting of two swarms into a hive may give to a family during the first year of its establishment, it can present none beyond that period; for the swarms that have been introduced will

have paid the debt of nature before its expiration, and are thereby reduced to a level with those that were not doubled. Dr. Bevan is wrong here, (continues Mr. Pettigrew,) for a swarm that weighs 8 lbs. (*i. e.* of course if put into a sufficiently roomy hive) hatches double the quantity of one that weighs 4 lbs., and consequently double the quantity of bees will live throughout the winter, set double the quantity of eggs in the spring, and so forth." He finishes by recommending a size of hive "for first or top swarms of from twenty to twenty-four inches wide and from twelve to fifteen inches deep." Such large hives, however, seem to lie under much the same objection as that I have advanced against the use of the Podolian hive, viz., that *quality* of honey is almost entirely sacrificed to *quantity*, which may do well enough for cottagers, but certainly will neither satisfy the amateur nor, I think, the fastidious purchaser.

In the same volume of the "Gardener's Chronicle" which contains Mr. Pettigrew's papers, I find the following communication by an anonymous correspondent, who brings forward the testimony of an *actual eye-witness* to the extent of the royal bee's fecundity. "The history of the bee (says this individual) has been written with so much truth by Huber, that little is left for inquiry. I know of but one error, which is, I presume, by the translator. The extraordinary fecundity of a queen is stated to be 200 eggs a day. A queen, which deposited no more eggs than that, would never produce a swarm, on account of the daily loss of bees which go out to the fields. I have had queens which laid 1000 eggs daily for three months in succession. This summer, (1844,) in a glass hive containing one comb four feet square, the queen deposited 800 eggs a day, or 16,000 in twenty days, 2000 of whom were males."

NOTE F, p. 91.

I SHALL entertain the reader here with an extract from my note-book, giving an account of an accident which happened to me last summer while making an artificial swarm, and its remedy, which will show with what reason I give the caution in the text, as well as suggest a method of extrication from a similar difficulty.

"22nd May. Walked to —— to breakfast, which being ended, Mr. —— took me to visit a farmer's wife in his parish who keeps bees. There we found two magnificent stocks, each with a great mass of bees depending from its board, well supplied with drones, and only waiting the queen's pleasure to be off. How great a temptation to our bee-driving propensities was here! What experimentalist could have resisted the impulse to force an issue on the spot! Good people all, learn a lesson from the following story, and do not meddle with *other people's bees! Expertis credite.* Having explained to the good woman of the house our own success in the matter of artificial swarming, and impressed her with some notion of the advantage which would result from the process, or at least with some degree of faith in our assurances, we obtained permission to form an artificial swarm on the spot out of one or both of her hives. Each of us having his bee-dress in his pocket, nothing seemed easier; having, therefore, duly armed ourselves, and provided every needful instrument to the process of driving, our patroness the mean while watching the proceedings from a barn-window overlooking the apiary, I commenced the operation in the usual manner, my friend assisting. In a few minutes, thinking by the hum in the upper hive that all was right, it was taken off, with a considerable swarm that had ascended into it, and put on the stand whence the old hive was taken, at the same time removing this to

another stand, and confining the bees, which remained in considerable numbers, with a list bandage. While we were congratulating ourselves on the success of our experiment, and were meditating an attack on the second hive, it suddenly became apparent that something was wrong with our newly-made swarm. The bees appeared restless and uneasy, and the air was filled with a vast multitude of them, having all the appearance of a natural swarm that had issued in the ordinary manner. In short, it was evident that they had missed their queen. To make sure of her absence from among them, a cloth was spread on the ground, and the bees that remained in the new hive were struck out upon it, the hive itself being at the same time placed near them at the edge of the cloth, resting on a stick. No doubt whatever now remained as to the cause of the commotion; for though many of the bees crawled rapidly towards the hive, and even entered it in considerable numbers, they crept out of it as fast again. In this dilemma nothing presented itself to be done, save to unfasten the bandage of the old hive and to restore it to its former place, that the outlying bees might find their way home again previous to a second attempt at driving. I am not aware if such an occurrence had been observed before, but at this juncture of affairs it became evident that the wandering and distressed bees had begun to fraternize with their neighbours of the other stock, which stood on the same shelf with themselves, at the distance of about a yard. A great many were seen walking towards it with fanning wings, nor were they at all ill-received, though I expected a mortal encounter: it seemed as if a most amicable disposition prevailed on the part of the uninjured stock towards its queenless neighbours. I believe, however, they all returned afterwards to their own hive. But to return to my story.

"Our calamities were not yet at an end, for in bringing

back the old hive to its former position a large comb full of brood, in every stage of advancement, disengaged itself from its fastenings and fell to the ground! Miserable now was the sight before us! As the result of our experiment hitherto upon this poor woman's bees, we had to show an irritated bee-population, a hive disturbed and mutilated, a large quantity of brood lying damaged on the ground, and not a few of the brave insects dead! How heartily did I repent having a hand in such a business!

"After much pondering and planning, my friend declared his resolution rather to destroy the hive altogether than to leave it in its present condition, a monument against the universal success of artificial swarming. At the worst, compensation could easily be made in an ample manner. But how to proceed was the difficulty. At first nothing presented but to attempt driving again, as the only chance of retrieving our damaged reputation. On proceeding, however, to lift the hive again from its stand, to our utter amazement and horror, down fell a second brood-comb, as full of young grubs and eggs as the former! Despair seized upon us both as we stood aghast at this fresh calamity. Doubtless the great agitation of the bees and the heat of the weather (for it was very warm) was the cause of this double misfortune.

"The explanation was easy enough, but how to remedy the evil was the question at this juncture. A sudden and happy thought fortunately crossed my mind, viz., that by the help of these two combs (which were filled, as I said before, with eggs and brood of all ages) we might still make a good artificial swarm on a different principle to that we had intended, so as, in fact, to test the Shirachean system. I proceeded accordingly to prop one comb against the other on the old stand, at an angle of about forty degrees, while my friend placed the hive over them.

No sooner was this effected, than all the bees, which had hitherto been swarming about like demented creatures, began hurriedly to enter, with buzzing wings and every token of joy, so that in an incredibly short space of time the bees were as busily employed in pursuing their usual avocations as if nothing whatever had happened. The removal and fastening up of the old hive closed the labours of this eventful morning. After explaining the matter as best we could to the bees' mistress, we returned home, vexed indeed, yet on the whole rejoicing that there was still good hope of success after all that had happened."

To the above I have to add the following extract:—

"Dec. 12. Paid a visit to Mr. ——, and called at the —— farm to inquire after the fate of our artificial swarm. It was reported to have been found 'very heavy' in the autumn when its owner gathered in her honey-harvest of the year The old stock out of which this was formed sent out no after-swarm; it was, however, rich in honey, and the bees had filled up the void place among the combs."

NOTE G, p. 96.

I SHALL here suggest to the experimentalist a somewhat different treatment of his spoliation-swarms to that pointed out in the text, of whose practical value, however, I cannot speak from experience.

In most parts of England honey only abounds in the fields, and woods, and meadows, in any surplus quantity, during the eight weeks following the 20th of May in average years. It is evident, therefore, that the more exclusively the attention of the bees is directed during this period to the object of collecting it, the larger becomes the profit of the bee-master, and in a ratio proportionate

to the population of the hive. Now it has occurred to me, that if we could altogether *prevent breeding* in a populous hive, the stores of honey garnered in a favourable season would be immense, as the bees would thus naturally devote their whole time and energies to this object, none being employed in nursing and tending the young; and in this way, that the grand secret would be disclosed of obtaining the *maximum* quantity of honey at the least possible expense of bee-labour. I conceive that this might be effected by destroying the queen of a prime-swarm, and compelling the bees to *rear a succession of artificial queens*, by supplying them from time to time with pieces of *worker-comb* containing eggs or very young larvæ. At the same time care should be taken to allow none of these queens to arrive at maturity, or to remove them (if young queens should be wanted elsewhere) the instant they emerge from the cell.

Should this method of treating a hive be thought worthy of a trial, I would recommend a close attention to the following directions, as being the most likely to ensure success. Let the swarm issue naturally or artificially, and hive it temporarily in the usual manner. Now procure a suitable piece of worker-comb by cutting it out of the parent stock, or of some other hive, taking care that there be not only very young larvæ, but *eggs* also. Next put a clean new hive upon its own bottom-board, and arrange the fragment of comb (which should be about three inches square) over one of the holes at the top of the hive, under a small glass just large enough to hold it. This being done, substitute this hive for the stock from which the swarm about to be experimented with proceeded, removing the old hive to some distance. Now search for the queen of the swarm by dashing them all out of their temporary abode upon the ground, in the manner pointed out at page 35, and destroy her when secured. The

bees, on recovering from their stupor and missing their queen, will, as is usual in such cases, fly away one by one to the well-known locality of their old dwelling. In an incredibly short time (though of course much agitated at first) the swarm will have comfortably established itself in its new dwelling, as soon as the piece of comb in the bee-glass is detected, and their attention turned to it, as the nursery of a new dynasty of queens. Somewhere between the tenth and fourteenth day after, the glass must be removed, and a fresh one substituted for it, having another piece of suitable brood-comb adjusted inside, and so on every fortnight, until the honey harvest is concluded, when, on plundering the hive, not a cell will be found defiled with the necessary pollutions of comb that has had brood in it. It is evident that according to this plan any number of youthful queens may be reared to substitute for old queens of other stocks, whose vigour is supposed to be on the decline.

To this most profitable plan of managing prime-swarms, on the spoliation system, I can only imagine one objection, viz., that the combs of the new hive, although free from the defilement of *brood*-cells, might yet be filled with useless hoards of *pollen*, stored up by the provident insects in anticipation of a day of need. How this would be I cannot tell; I only throw out these suggestions for the consideration of the curious apiarian. As to the ultimate fate of the bees, they would, if left to themselves, gradually dwindle away by natural death, so that not one probably would be found alive by Christmas. The most humane method of dealing with them, therefore, would be to fumigate and drown them afterwards, or destroy them over the brimstone pit.

Since writing the above the admirable work of Bonner has come into my hands, who, I find, had an idea of the advantage which might accrue from the early removal of

its queen from a hive destined for autumn plunder. "If I intended to kill a hive of bees in autumn (he says), I would prefer the taking away their queen from them about the end of July, and leaving a great number of common bees in the hive, which, as they would have few bees to nurse up, would collect a greater quantity of honey in that period than if they had a queen in the hive daily laying eggs for them, which would employ a good number of the bees both to hatch and nurse up the young, and thereby the fewer would be employed in collecting honey."

NOTE H, p. 98.

I AM not aware that any experiments have been instituted, or, at least, their results published, which tend to explain the probable consumption of honey in the elaboration of wax. This is a question of considerable importance in apiarian economics, as it would teach us the value of this latter substance, and lead to a discouragement of all unnecessary construction of comb, in the event of its being found the costly article which I am disposed to believe it is.

The pound of wax sells for, at least, double the money that a pound of average honey will fetch in the market; whence, it might, at first sight, seem desirable to encourage comb-making; but this, a little reflection will show to be a mistake: for, if wax be a secretion from honey, as all apiarians are now agreed in believing it to be, it requires no further proof to satisfy us that honey is, in reality, the costlier article of the two. If this be granted, and I do not see how it can be denied, it remains to be proved that the difference is so great as to make it an important point in bee-management to discourage the unnecessary elaboration of wax. As a

stimulus to future experiment, and a clue towards arriving at some definite and certain knowledge upon the subject, I insert here the following extract from my note-book, the purport of which I have already communicated to the "Cottage Gardener":—

"Huber tells us that he has found coarse sugar yield a large quantity of wax, and of a paler colour than honey. If this be true, some experiments that I have made in the rearing of artificial stocks this autumn (1850), have opened my eyes to the very great *costliness of wax* in the economy of bee-management. Having driven the population of four stocks, on the 5th of August, and united them together, I located them in a spare bee-box in my window apiary, and fed them with a preparation of sugar, honey, salt, and beer, for about five weeks. Although they consumed about 50 lbs. of this mixture (the same as that described in Chapter XI. of this volume), at the end of that time the box was found to weigh no more than *sixteen pounds* of *contents*, i. e. *minus* the box only. Of this I reckon about 12 lbs. to be stored food, $3\frac{1}{2}$ lbs. bees and bee-bread, and the remaining half-pound pure wax or comb. Thus, if there be deducted from these 46 lbs. of food, the actually stored 12 lbs., there remain 34 lbs. to be accounted for. The actual consumption of any considerable quantity of it *as food* can hardly be imagined, for my other hives were maintaining themselves all this time almost entirely upon what they still collected in the fields. For instance, one hive, whose population was the most numerous, diminished in weight 3 lbs. in the interval between the 5th of August and the 29th of October; a *second*, 3 lbs. 8 oz. between the 3rd of August and the 8th of November (when I buried it); a *third* (whose position I changed at the end of July), 5 lbs. between the 8th of August and the 12th of October. Now I do not think that the increased activity

of this experimental hive, will any thing like explain away the 34 lbs. by supposing so enormous a consumption *as food*, even allowing that their appetite was proportionably excited; thus, there remains nothing for us but to conclude that by *far the greater part*, say, *at least* 25 lbs., *was consumed in elaborating the half pound of wax, employed in constructing the comb.*"

We cannot of course form any certain conclusion from this fact, because we have yet to ascertain whether pure honey or the prepared food, of which I made use, contains the larger quantity of the waxen element. As this is a question of no little importance, I would gladly induce some experimental apiarian to join me in my endeavours to ascertain the truth in this matter, which I propose to attempt in the course of the approaching summer or autumn.

NOTE I, p. 132.

It seems necessary that I should caution the reader against a too indiscriminate or systematic destruction of his queen-bees, without a due regard to circumstances. I have stated that, as a *general rule*, I believe the queen-bee to be in her prime the second twelvemonth of her existence; and in stating this, I but repeat what other naturalists and bee-authors have stated before. Therefore, as a *rule*, it follows that, where it can be done *judiciously*, a succession of young queens, not exceeding two years old, should be kept up by a biennial removal of the old ones. But it must be borne in mind, that all queens are not *equally* prolific or fruitful mothers; therefore, in the event of a queen's having proved herself an extraordinarily good breeder one year, it will be for the apiarian to consider whether he may not become a loser by exchanging her for a younger queen. I myself should by all means per-

mit her to reign a third summer; and, it may be, even a fourth, should her vigour not seem too considerably abated, but this very rarely. In judging of a queen's vigour, again, it must be borne in mind, that the same mother, who in a thinly-peopled hive would be a bad breeder, would probably prove very fertile in a populous stock. And for similar reasons, a queen born in a very strong stock would turn out more prolific than a princess reared in a weak hive,—whether artificially or naturally reared it matters not.

The bee-master cannot greatly err, therefore, who exchanges the queens of his strong stocks *triennially*, though, no doubt, in the end, he would find it more profitable to change them *every two years*.

NOTE K, p. 143.

Although the account of my discovery of this plan of uniting bees has been communicated at different times to the "Cottage Gardener," I may be pardoned for re-introducing it here, as it may be interesting to some who have not seen it in that periodical. The following is an extract from my communication to this paper. "I hit upon the plan accidentally, as I was hesitating between the adoption of the fumigating or sugar-and-water drowning process of uniting bees, one or other of which is recommended generally by apiarians. I was quite unused to either of these plans, and somewhat dreaded the experiment. The scene of operation was the small nursery back-garden of some excellent friends of mine, who had kindly permitted me to make what use I pleased of the population of five cottage hives, which they intended to plunder, and the time was 8½ p. m., on the 9th of August, 1849. After trying what I could do with one hive by fumigation, and having made a terrible

mess of the affair, I proceeded to try the sugar-and-water drowning process; to effect which, I proposed first to drive into separate empty hives the population of two strong stocks; and then, after sprinkling them with sugar-and-water, to mix the bees together. The job, however, appeared so awkward and filthy, that my heart greatly revolted against it; however, there seemed no remedy, so to driving I went. A magnificent second-year stock, as full of bees as it could hold (the more bees the better for the success of the experiment), was successfully driven in about fifteen minutes into an empty hive, which was taken off and put gently aside until wanted again. The few remaining bees next were fumigated with sulphur before being taken into the house. Another fine and populous stock was then turned up as before, an early cast of the current year, but, instead of placing an empty hive over it as before, it suddenly crossed my mind to try what driving into the other *already temporarily-occupied hive* would do,—the empty hive, I mean, into which the population of the first hive had already been driven. But would they not fight and destroy each other? If they did, thought I, I have yet two good stocks to fall back upon; so, in an instant, the tenanted combless hive was gently placed over the now reversed cast, and to driving we went in good earnest. 'Hark! what an awful buzzing!' said my companion, and, indeed, I began to dread a general massacre as the hum increased; presently, however, our tapping having ceased, the hum died away, and a profound silence reigned within. My success was complete, for, on taking off the upper hive, an enormous mass of bees was disclosed to view, hanging motionless in thick clusters from the roof, united together in great apparent harmony and tranquillity. The few remaining bees in the old hive were sulphured as before; and our united hive was suffered

to remain till morning resting over an empty bucket, within two yards of their old locality, and covered with a sheet. Great was the activity of our newly-formed stock, the next day (but no signs of war were visible), till about $2\frac{1}{2}$ p. m., when I shook them all out upon a sheet on the ground in front of the box, which was destined for their reception, into which they all immediately crept after their queen. As soon as they had nearly all left the cloth, the conquered queen was discovered in front of the box *dead*, but still surrounded by an escort of bees who paid her the last tribute of respect and loyalty. The box, containing the now united swarm, was transferred the same evening to my own apiary, where it remains to this day."

THE END.

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